Silicon Metal from Bosnia and Herzegovina, Iceland, and Kazakhstan

Investigation Nos. 701-TA-652 and 731-TA-1524-1525 (Final)

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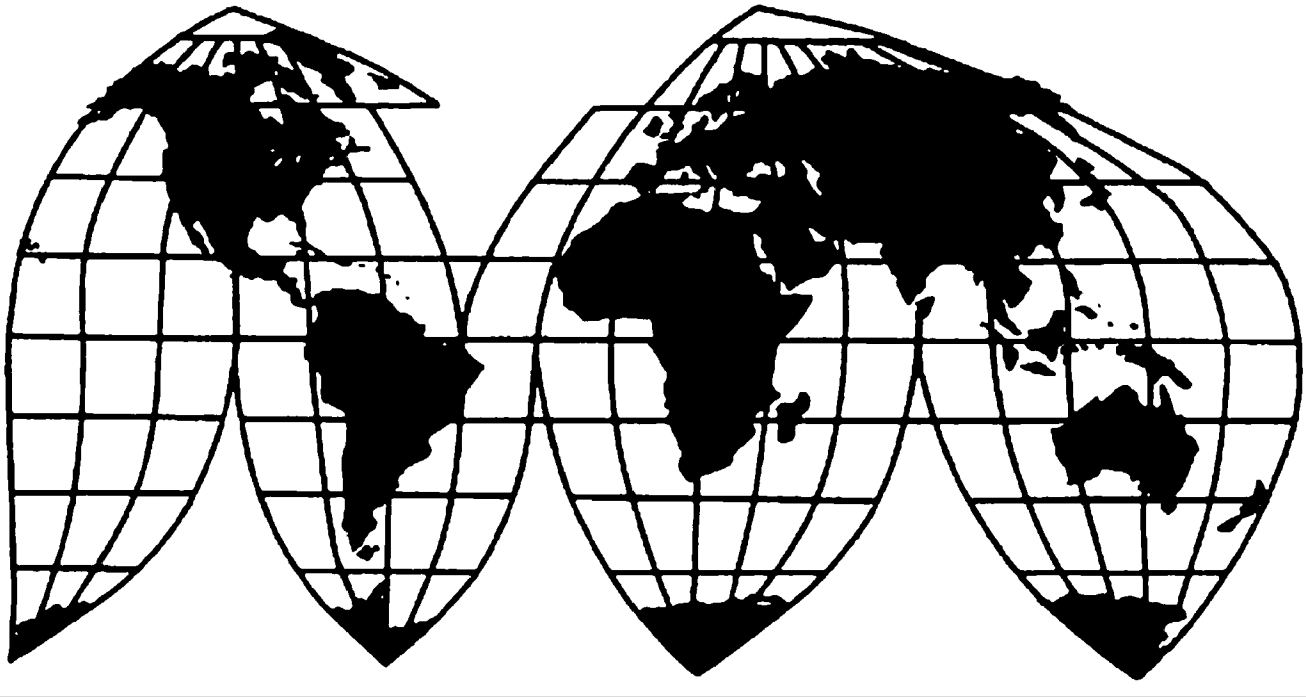
U.S. International Trade Commission



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Note.—Information that would reveal confidential operations of individual concerns may not be published. Such information is identified by brackets in confidential reports and is deleted and replaced with asterisks (***) in public reports.

UNITED STATES INTERNATIONAL TRADE COMMISSION

Investigation Nos. 701-TA-652 and 731-TA-1524-1525 (Final)

Silicon Metal from Bosnia and Herzegovina, Iceland, and Kazakhstan

DETERMINATIONS

On the basis of the record[1] developed in the subject investigations, the United States International Trade Commission ("Commission") determines, pursuant to the Tariff Act of 1930 ("the Act"), that an industry in the United States is materially injured by reason of imports of silicon metal from Bosnia and Herzegovina and Iceland, provided for in subheadings 2804.69.10 and 2804.69.50 of the Harmonized Tariff Schedule of the United States, that have been found by the U.S. Department of Commerce ("Commerce") to be sold in the United States at less than fair value ("LTFV"), and to be subsidized by the Government of Kazakhstan.[2]

BACKGROUND

The Commission instituted these investigations effective June 30, 2020, following receipt of petitions filed with the Commission and Commerce by Globe Specialty Metal, Inc., Beverly, Ohio and Mississippi Silicon, LLC, Burnsville, Mississippi. The final phase of the investigations was scheduled by the Commission following notification of preliminary determinations by Commerce that imports of silicon metal from Kazakhstan were subsidized within the meaning of section 703(b) of the Act (19 U.S.C. 1671b(b)) and that imports of silicon metal from Bosnia and Herzegovina and Iceland were being sold at LTFV within the meaning of 733(b) of the Act (19 U.S.C. 1673b(b)). Notice of the scheduling of the final phase of the Commission's investigations and of a public hearing to be held in connection therewith was given by posting copies of the notice in the Office of the Secretary, U.S. International Trade

[1] The record is defined in § 207.2(f) of the Commission's Rules of Practice and Procedure (19 CFR 207.2(f)).

[2] The Commission also finds that imports subject to Commerce's affirmative critical circumstances determination are not likely to undermine seriously the remedial effect of the antidumping duty order on silicon metal from Iceland.

Commission, Washington, DC, and by publishing the notice in the *Federal Register* on December 30, 2020 (85 FR 86578). In light of the restrictions on access to the Commission building due to the COVID–19 pandemic, the Commission conducted its hearing through written testimony and video conference on February 22, 2021. All persons who requested the opportunity were permitted to participate.

Views of the Commission

Based on the record in the final phase of these investigations, we determine that an industry in the United States is materially injured by reason of imports of silicon metal from Bosnia and Herzegovina and Iceland, found by the U.S. Department of Commerce ("Commerce") to be sold in the United States at less than fair value, and imports of silicon metal from Kazakhstan found to be subsidized by the government of Kazakhstan.

I. Background

Globe Specialty Metals, Inc. ("Globe") and Mississippi Silicon LLC ("MS Silicon") (collectively, "Petitioners"), domestic producers of silicon metal, filed the antidumping and countervailing duty petitions on imports of silicon metal from Bosnia and Herzegovina, Iceland, Kazakhstan, and Malaysia on June 30, 2020. In November 2020, Commerce aligned its final countervailing duty determination regarding silicon metal from Kazakhstan with the final antidumping determinations regarding silicon metal from Bosnia and Herzegovina, Iceland, and Malaysia. The investigation schedules became staggered when Commerce postponed its final antidumping duty determination regarding silicon metal from Malaysia (the "trailing" investigation), but not its final determinations regarding silicon metal from Bosnia and Herzegovina, Iceland, and Kazakhstan (collectively, the "leading" investigations).[1] As a result of this staggering, the Commission must make earlier final determinations in the leading investigations on silicon metal from Bosnia and Herzegovina, Iceland, and Kazakhstan, than in the trailing investigation regarding Malaysia. Pursuant to the statutory provision on staggered investigations, the record for each of these investigations will be the same except that prior to the Commission's antidumping duty determination on silicon metal from Malaysia, the Commission shall include the final Commerce dumping determination and the parties' final comments concerning that determination in the record.[2]

[1] *Silicon Metal From Malaysia: Preliminary Affirmative Determination of Sales at Less Than Fair Value, Postponement of Final Determination, and Extension of Provisional Measures*, 86 Fed. Reg. 7701 (Feb. 1, 2021); *Silicon Metal From the Republic of Kazakhstan: Final Affirmative Countervailing Duty Determination*, 86 Fed. Reg. 11725 (Feb. 26, 2021); *Silicon Metal From Bosnia and Herzegovina and Iceland: Final Affirmative Determinations of Sales at Less Than Fair Value and Final Affirmative Determination of Critical Circumstances for Iceland*, 86 Fed. Reg. (Feb. 26, 2021).

[2] *See* 19 U.S.C. 1677(7)(G)(iii). Commerce is currently scheduled to issues its final determination in the trailing investigation no later than 135 days after the publication of its preliminary determination, or Wednesday, June 16, 2021. *See Silicon Metal From Malaysia: Preliminary Affirmative Determination of Sales at Less Than Fair Value, Postponement of Final Determination, and Extension of Provisional Measures*, 86 Fed. Reg. 7701 (Feb. 1, 2021).

Representatives for Petitioners appeared at the hearing accompanied by counsel, submitted prehearing and posthearing briefs, and filed final comments.[3] Five respondent entities participated actively in the final phase investigations. Representatives and counsel for MTALX Limited ("MTALX"), a U.S. importer of subject merchandise, filed prehearing and posthearing briefs; PCC BakkiSilicon hf ("PCC"), a foreign producer and exporter of subject merchandise in Iceland, filed prehearing and posthearing briefs, commented on draft questionnaires, appeared at the hearing accompanied by counsel, and submitted final comments; PMB Silicon Sdn Bhd ("PMB"), a foreign producer and exporter in Malaysia, filed prehearing and posthearing briefs and appeared at the hearing accompanied by counsel; R-S Silicon d.o.o. Mrkonjic Grad ("RS Silicon"), a foreign producer and exporter of subject merchandise in Bosnia and Herzegovina, filed prehearing and posthearing briefs, appeared at the hearing accompanied by counsel, and submitted final comments; and Wacker Polysilicon North America, LLC ("WPNA"), a U.S. purchaser and importer of silicon metal, filed prehearing and posthearing briefs, and participated in the hearing accompanied by counsel.

U.S. industry data are based on the questionnaire responses from three domestic producers whose production accounted for all domestic production of silicon metal in 2020.[4] U.S. import data are based on official Commerce import statistics over the January 2018 to December 2020 period of investigation ("POI") and on questionnaire responses of 16 U.S. importers of silicon metal, which accounted for *** of subject imports from Bosnia and Herzegovina; *** of subject imports from Iceland; *** percent of subject imports from Kazakhstan; and *** of subject imports from Malaysia in 2020.[5] Data concerning the subject industries are based on questionnaire responses from one foreign producer in Bosnia and Herzegovina, whose exports accounted for *** percent of U.S. imports of silicon metal from Bosnia and Herzegovina; one firm in Iceland, whose exports accounted for *** percent of U.S. imports of silicon metal from Iceland; one firm in Kazakhstan, whose exports accounted for *** percent of U.S. imports of silicon metal from Kazakhstan; and one firm in Malaysia, whose exports accounted for *** percent of U.S. imports of silicon metal from Malaysia in 2020.[6]

[3] In light of the restrictions on access to the Commission building due to the COVID-19 pandemic, the Commission conducted its hearing through videoconference held on Feb. 22, 2021, as set forth in procedures provided to the parties.

[4] Confidential Report ("CR"), INV-TT-040, and Public Report ("PR"), USITC Pub. 5180 (Mar. 2021), at III-1. DC Alabama is the third U.S. producer, in addition to the two Petitioners. *Id*.

[5] CR/PR at I-5. Reported imports of silicon metal from nonsubject sources accounted for *** of imports from nonsubject countries and *** of all imports of silicon metal from all sources in 2020. *Id*.

[6] CR/PR at I-5-6.

II. Domestic Like Product

A. In General

In determining whether an industry in the United States is materially injured or threatened with material injury by reason of imports of subject merchandise, the Commission first defines the "domestic like product" and the "industry."[7] Section 771(4)(A) of the Tariff Act of 1930, as amended ("the Tariff Act"), defines the relevant domestic industry as the "producers as a whole of a domestic like product, or those producers whose collective output of a domestic like product constitutes a major proportion of the total domestic production of the product."[8] In turn, the Tariff Act defines "domestic like product" as "a product which is like, or in the absence of like, most similar in characteristics and uses with, the article subject to an investigation."[9]

By statute, the Commission's "domestic like product" analysis begins with the "article subject to an investigation," *i.e.*, the subject merchandise as determined by Commerce.[10] Therefore, Commerce's determination as to the scope of the imported merchandise that is subsidized and/or sold at less than fair value is "necessarily the starting point of the Commission's like product analysis."[11] The Commission then defines the domestic like product in light of the imported articles Commerce has identified.[12] The decision regarding the appropriate domestic like product(s) in an investigation is a factual determination, and the Commission has applied the statutory standard of "like" or "most similar in characteristics and

[7] 19 U.S.C. § 1677(4)(A).

[8] 19 U.S.C. § 1677(4)(A).

[9] 19 U.S.C. § 1677(10).

[10] 19 U.S.C. § 1677(10). The Commission must accept Commerce's determination as to the scope of the imported merchandise that is subsidized and/or sold at less than fair value. *See*, *e.g.*, *USEC, Inc. v. United States*, 34 Fed. App'x 725, 730 (Fed. Cir. 2002) ("The ITC may not modify the class or kind of imported merchandise examined by Commerce."); *Algoma Steel Corp. v. United States,* 688 F. Supp. 639, 644 (Ct. Int'l Trade 1988), *aff'd*, 865 F.3d 240 (Fed. Cir.), *cert. denied*, 492 U.S. 919 (1989).

[11] *Cleo Inc. v. United States*, 501 F.3d 1291, 1298 (Fed. Cir. 2007); *see also Hitachi Metals, Ltd. v. United States*, Case No. 19-1289, slip op. at 8-9 (Fed. Circ. Feb. 7, 2020) (the statute requires the Commission to start with Commerce's subject merchandise in reaching its own like product determination).

[12] *Cleo*, 501 F.3d at 1298 n.1 ("Commerce's {scope} finding does not control the Commission's {like product} determination."); *Hosiden Corp. v. Advanced Display Mfrs.,* 85 F.3d 1561, 1568 (Fed. Cir. 1996) (the Commission may find a single like product corresponding to several different classes or kinds defined by Commerce); *Torrington Co. v. United States*, 747 F. Supp. 744, 748–52 (Ct. Int'l Trade 1990), *aff'd*, 938 F.2d 1278 (Fed. Cir. 1991) (affirming the Commission's determination defining six like products in investigations where Commerce found five classes or kinds).

uses" on a case-by-case basis.[13] No single factor is dispositive, and the Commission may consider other factors it deems relevant based on the facts of a particular investigation.[14] The Commission looks for clear dividing lines among possible like products and disregards minor variations.[15]

B. Product Description

Commerce defined the scope of the imported merchandise under investigation as follows:

> The scope of these investigations covers all forms and sizes of silicon metal, including silicon metal powder. Silicon metal contains at least 85.00 percent but less than 99.99 percent silicon, and less than 4.00 percent iron, by actual weight. Semiconductor grade silicon (merchandise containing at least 99.99 percent silicon by actual weight and classifiable under Harmonized Tariff Schedule of the United States (HTSUS) subheading 2804.61.0000) is excluded from the scope of these investigations.
>
> Silicon metal is currently classifiable under subheadings 2804.69.1000 and 2804.69.5000 of the HTSUS. While the HTSUS numbers are provided

[13] *See, e.g., Cleo Inc. v. United States*, 501 F.3d 1291, 1299 (Fed. Cir. 2007); *NEC Corp. v. Department of Commerce*, 36 F. Supp. 2d 380, 383 (Ct. Int'l Trade 1998); *Nippon Steel Corp. v. United States*, 19 CIT 450, 455 (1995); *Torrington Co. v. United States*, 747 F. Supp. 744, 749 n.3 (Ct. Int'l Trade 1990), *aff'd*, 938 F.2d 1278 (Fed. Cir. 1991) ("every like product determination 'must be made on the particular record at issue' and the 'unique facts of each case'"). The Commission generally considers a number of factors, including the following: (1) physical characteristics and uses; (2) interchangeability; (3) channels of distribution; (4) customer and producer perceptions of the products; (5) common manufacturing facilities, production processes, and production employees; and, where appropriate, (6) price. *See Nippon*, 19 CIT at 455 n.4; *Timken Co. v. United States*, 913 F. Supp. 580, 584 (Ct. Int'l Trade 1996).

[14] *See*, *e.g.*, S. Rep. No. 96-249 at 90-91 (1979).

[15] *Nippon*, 19 CIT at 455; *Torrington*, 747 F. Supp. at 748-49; *see also* S. Rep. No. 96-249 at 90-91 (Congress has indicated that the like product standard should not be interpreted in "such a narrow fashion as to permit minor differences in physical characteristics or uses to lead to the conclusion that the product and article are not 'like' each other, nor should the definition of 'like product' be interpreted in such a fashion as to prevent consideration of an industry adversely affected by the imports under consideration.").

for convenience and customs purposes, the written description of the scope remains dispositive.[16]

Silicon is a light chemical element with metallic and nonmetallic characteristics.[17] It is a semiconductor, meaning it does not conduct electricity at room temperature, but does so when it is heated. Silica in the form of quartz or quartzite is used to produce silicon ferroalloys for the iron and steel industries, while silicon metal is primarily used by the aluminum and chemical industries.[18] Silicon metal is a product normally composed almost entirely of elemental silicon, along with small amounts of other elements, such as iron, aluminum, and calcium. It is manufactured and sold in various degrees of purity. Silicon metal is often described in terms of "grades" which refer to ranges of specifications establishing the minimum amounts of silicon and the maximum amounts of other elements, such as boron, iron, calcium and aluminum that silicon metal may contain. Unlike grades for some other industrial products, different "grades" of silicon metal do not necessarily differ in terms of quality; rather, the ranges of specifications that determine "grades" vary depending on the type of end use of the silicon metal. The four broadly defined "grades" are: (1) semiconductor grade;[19] (2) chemical grade; (3) metallurgical grade used to produce primary aluminum; and (4) metallurgical grade used to produce secondary aluminum.[20] Whether domestic or imported, it is usually sold in lump form, typically ranging from 6 inches x ½ inch to 4 inches x ¼ inch, or in powder form.[21]

Silicon metal is used in the production of both primary aluminum (produced from ore) and secondary aluminum (produced from scrap). Silicon is a necessary ingredient in aluminum casting alloys, where it improves fluidity, castability, strength, and weldability when added to aluminum.[22] Chemical manufacturers also consume silicon metal to produce silicones and polysilicon. Silicones are used for a variety of applications including adhesives, resins,

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[16] *Silicon Metal From Bosnia and Herzegovina and Iceland: Final Affirmative Determinations of Sales at Less than Fair Value and Final Affirmative Determination of Critical Circumstances for Iceland*, 86 Fed. Reg. 11720 (Feb. 26, 2021); *Silicon Metal From the Republic of Kazakhstan: Final Affirmative Countervailing Duty Determination*, 86 Fed. Reg. 11725 (Feb. 26, 2021).

[17] CR/PR at I-10.

[18] CR/PR at I-10.

[19] Semiconductor grade silicon metal, a high-purity product generally containing over 99.99 percent silicon, is not covered by the scope of these investigations. *Silicon Metal From Bosnia and Herzegovina and Iceland: Final Affirmative Determinations of Sales at Less than Fair Value and Final Affirmative Determination of Critical Circumstances for Iceland*, 86 Fed. Reg. 11720 (Feb. 26, 2021); *Silicon Metal From the Republic of Kazakhstan: Final Affirmative Countervailing Duty Determination*, 86 Fed. Reg. 11725 (Feb. 26, 2021).

[20] CR/PR at I-11-I-12.

[21] CR/PR at I-10-11.

[22] CR/PR at I-11.

lubricants, plastomers, anti-foaming agents, and water-repellent compounds.[23] Polysilicons are used in solar power and electronics applications.[24]

C. Arguments of the Parties

Petitioners' *Arguments*. Petitioners argue that the Commission should find a single domestic like product consisting of silicon metal, coextensive with the scope.[25] They note that no party has sought a different domestic like product definition.[26] Petitioners claim that silicon metal is a commodity product and, while it can be produced to various specifications, it is interchangeable when produced to the same specifications, regardless of source.[27]

Respondents' *Arguments*. PMB does not contest the definition of the domestic like product set forth by the Commission in the preliminary determinations.[28] The other respondent interested parties did not address domestic like product arguments.

D. Domestic Like Product Analysis

In its preliminary determinations the Commission defined a single domestic like product that is coextensive with the scope consisting of silicon metal.[29] The issue was not disputed. The Commission found that all domestically produced silicon metal within the scope shares the same basic physical characteristics and manufacturing process, that most domestically produced silicon metal is sold in the same channels of distribution, and that domestically produced silicon metal produced to the same specifications is generally interchangeable. The Commission noted that the record was limited with respect to producer and customer perceptions and price.[30]

There is no new information in the final phase investigations that calls into question the findings the Commission made in the preliminary phase.[31] Moreover, no party contests the

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[23] CR/PR at I-11.

[24] CR/PR at I-4.

[25] Petitioners' Prehearing Br. at 1.

[26] Petitioners' Prehearing Br. at 1-9.

[27] Petitioners' Prehearing Br. at 5.

[28] PMB Prehearing Br. at 2.

[29] *Silicon Metal from Bosnia and Herzegovina, Iceland, Kazakhstan, and Malaysia*, Inv. Nos. 701-TA-652 and 731-TA-1524-1526 (Preliminary), USITC Pub. 5107 at 9-10 (Aug. 2020) ("Preliminary Determinations").

[30] Preliminary Determinations, USITC Pub. 5107 at 9-10.

[31] *See* CR/PR at I-10-18. Consistent with the Commission's findings in the preliminary determination, all domestically produced silicon metal within the scope shares the same basic physical characteristics and manufacturing process, most domestically produced silicon metal is sold in the same (Continued...)

Commission's domestic like product definition in the preliminary determinations. Accordingly, we define a single domestic like product consisting of silicon metal, coextensive with the scope.

III. Domestic Industry

The domestic industry is defined as the domestic "producers as a whole of a domestic like product, or those producers whose collective output of a domestic like product constitutes a major proportion of the total domestic production of the product."[32] In defining the domestic industry, the Commission's general practice has been to include in the industry producers of all domestic production of the like product, whether toll-produced, captively consumed, or sold in the domestic merchant market.

There are no related party or other domestic industry issues in these final phase investigations.[33] Petitioners agree with the Commission's definition of the domestic industry as all U.S. producers of silicon metal in the preliminary determinations.[34] No respondent interested party raised domestic industry arguments in the final phase.

Accordingly, in light of our definition of domestic like product, we define the domestic industry as all domestic producers of silicon metal.

IV. Cumulation[35]

For purposes of evaluating the volume and effects for a determination of material injury by reason of subject imports, section 771(7)(G)(i) of the Tariff Act requires the Commission to

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channels of distribution, and domestically produced silicon metal produced to the same specifications is generally interchangeable. CR/PR at II-16, Table II-1. In addition, producers and consumers generally perceive silicon metal from all sources as always or sometimes interchangeable and prices of the various silicon metal pricing products are within the same general range. CR/PR at Tables II-10, V-3-V-5.

[32] 19 U.S.C. § 1677(4)(A).

[33] No domestic producer imported (or purchased) subject merchandise during the POI, or is related to an importer or foreign exporter of subject merchandise. *See* CR/PR at Table III-2.

[34] Petitioners' Prehearing Br. at 1.

[35] Pursuant to Section 771(24) of the Tariff Act, imports from a subject country of merchandise corresponding to a domestic like product that account for less than 3 percent of all such merchandise imported into the United States during the most recent 12 months for which data are available preceding the filing of the petition shall be deemed negligible. 19 U.S.C. §§ 1671b(a), 1673b(a), 1677(24)(A)(i), 1677(24)(B); *see also* 15 C.F.R. § 2013.1 (developing countries for purposes of 19 U.S.C. § 1677(36)). The statute further provides that subject imports from a single country which comprise less than 3 percent of total such imports of the product may not be considered negligible if there are several countries subject to investigation with negligible imports and the sum of such imports from all those countries collectively accounts for more than 7 percent of the volume of all such merchandise imported into the United States. 19 U.S.C. § 1677(24)(A)(ii). In the case of countervailing duty investigations involving developing countries (as designated by the United States Trade Representative), the statute (Continued...)

cumulate subject imports from all countries as to which petitions were filed and/or investigations self-initiated by Commerce on the same day, if such imports compete with each other and with the domestic like product in the U.S. market. In assessing whether subject imports compete with each other and with the domestic like product, the Commission generally has considered four factors:

(1) the degree of fungibility between subject imports from different countries and between subject imports and the domestic like product, including consideration of specific customer requirements and other quality related questions;

(2) the presence of sales or offers to sell in the same geographic markets of subject imports from different countries and the domestic like product;

(3) the existence of common or similar channels of distribution for subject imports from different countries and the domestic like product; and

(4) whether the subject imports are simultaneously present in the market.[36]

While no single factor is necessarily determinative, and the list of factors is not exclusive, these factors are intended to provide the Commission with a framework for determining whether the subject imports compete with each other and with the domestic like product.[37] Only a "reasonable overlap" of competition is required.[38]

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indicates that the negligibility limits are 4 percent and 9 percent, rather than 3 percent and 7 percent. 19 U.S.C. § 1677(24)(B).

Imports from each subject country exceed the statutory negligibility threshold. Imports from Bosnia and Herzegovina, Iceland, and Kazakhstan accounted for 7.35 percent, 4.17 percent, and 3.03 percent of total imports, respectively. *Derived from* CR/PR at Table IV-5.

[36] *See Certain Cast-Iron Pipe Fittings from Brazil, the Republic of Korea, and Taiwan*, Inv. Nos. 731-TA-278-280 (Final), USITC Pub. 1845 (May 1986), *aff'd*, *Fundicao Tupy, S.A. v. United States*, 678 F. Supp. 898 (Ct. Int'l Trade), aff'd, 859 F.2d 915 (Fed. Cir. 1988).

[37] *See*, *e.g.*, *Wieland Werke, AG v. United State*s, 718 F. Supp. 50 (Ct. Int'l Trade 1989).

[38] The Statement of Administrative Action (SAA) to the Uruguay Round Agreements Act (URAA), expressly states that "the new section will not affect current Commission practice under which the statutory requirement is satisfied if there is a reasonable overlap of competition." H.R. Rep. No. 103-316, Vol. I at 848 (1994) (*citing Fundicao Tupy, S.A. v. United States*, 678 F. Supp. at 902; *see Goss Graphic Sys., Inc. v. United States*, 33 F. Supp. 2d 1082, 1087 (Ct. Int'l Trade 1998) ("cumulation does not require two products to be highly fungible"); *Wieland Werke, AG*, 718 F. Supp. at 52 ("Completely overlapping markets are not required.").

Petitioners' Arguments. Petitioners urge the Commission to cumulate subject imports from all four subject countries.[39] They note that the statutory requirement is met that the petition was filed on the same day with respect to silicon metal imports that were sold at LTFV from Bosnia and Herzegovina, Iceland, and Malaysia, and subsidized silicon metal imports from Kazakhstan.[40]

Petitioners argue that there is a high degree of fungibility among subject imports from each subject country and the domestic like product.[41] They assert that silicon metal is a commodity product and interchangeable when produced to the same specifications, regardless of source.[42] Petitioners argue that subject imports and domestic merchandise share common and similar channels of distribution, are sold in the same geographic markets, and that there is a significant overlap in subject imports' presence in the U.S. market.[43]

Respondents' Arguments. The Commission received a variety of cumulation arguments from the respondent parties.[44] PCC argues that the Commission should not cumulate imports from any of the four subject countries for its material injury analysis.[45] PCC asserts that there is limited fungibility between subject imports and the domestic like product because subject imports are limited to pricing product 2, secondary aluminum grade silicon metal, while the percentage of U.S. commercial shipments by the U.S. industry to the secondary aluminum market ranged from *** percent to *** percent during the POI.[46] According to PCC, this limited overlap is not sufficient to warrant cumulative assessment of the impact of subject imports on the domestic industry.[47] PCC asserts that it would be improper for the Commission to disregard the three product categories in assessing fungibility.[48] PCC maintains that there is no head-to-head competition between subject imports, which are principally sold to the secondary aluminum market, and the domestic like product, which is principally sold to the chemical segment.[49] PCC also argues that subject imports were not simultaneously present in the U.S.

[39] Petitioners' Prehearing Br. at 3.
[40] Petitioners' Prehearing Br. at 3.
[41] Petitioners' Prehearing Br. at 4.
[42] Petitioners' Prehearing Br. at 5.
[43] Petitioners' Prehearing Br. at 7-10.
[44] PMB does not raise any cumulation arguments for the purpose of the Commission's material injury analysis, but appears to rely on cumulation of imports from all subject countries in its present material injury arguments.
[45] PCC Prehearing Br. at 46.
[46] PCC Prehearing Br. at 46-47.
[47] PCC Prehearing Br. at 47.
[48] PCC Prehearing Br. at 47.
[49] PCC Prehearing Br. at 48.

market during a large part of the POI.[50] PCC maintains that imports from the four subject countries were largely present at different times throughout the POI and generally did not compete with each other.[51]

RS Silicon argues that imports from Bosnia and Herzegovina should not be cumulated with imports from the other subject countries for the purposes of the Commission's material injury analysis because there is no reasonable overlap of competition between subject imports and its channel of distribution is unique.[52] RS Silicon claims that it never directly exported silicon to the United States, nor did it have any contact with any U.S. purchasers or know where the importer resold its merchandise.[53] RS Silicon also claims that subject imports from Bosnia and Herzegovina primarily went to distributors, whereas subject imports from the other subject countries was sold to secondary aluminum producers.[54] RS Silicon asserts that there is no record evidence that subject imports from Bosnia and Herzegovina were sold in any of the same regions in which subject imports from the other subject countries were present.[55]

The statutory threshold for cumulation is satisfied in these investigations because Petitioners filed the antidumping and countervailing duty petitions with respect to all four subject countries on the same day, June 30, 2020.[56]

Fungibility. Two responding producers and most responding metallurgical end users of silicon metal reported that silicon metal from all country pairs was always interchangeable.[57] Most importers reported that product from all country pairs were frequently or sometimes interchangeable, and subject imports and the domestically produced product were sometimes interchangeable.[58] The record indicates that for metallurgical end uses, there is a high degree of substitutability between domestically produced silicon metal and silicon metal imported

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[50] PCC Prehearing Br. at 49. It asserts that a mere reference to the number of months in which the imports were present from each country is insufficient to determine the simultaneous presence of such imports. *Id*.

[51] PCC Prehearing Br. at 49-50.

[52] RS Silicon Prehearing Br. at 1-2.

[53] RS Silicon Prehearing Br. at 3.

[54] RS Silicon Prehearing Br. at 4.

[55] RS Silicon Prehearing Br. at 5.

[56] None of the statutory exceptions to cumulation apply. We observe that these investigations involve dumping findings regarding silicon metal from three subject countries and a subsidy finding regarding silicon metal from one country. Consequently, any decision to cumulate imports from all subject sources in these investigations will involve "cross-cumulating" dumped imports with subsidized imports. We have previously explained why we are continuing our longstanding practice of cross-cumulating. *See Polyethylene Terephthalate (PET) Resin from Canada, China, India, and Oman,* Inv. Nos. 701-TA-531-532 and 731-TA-1270-1273 (Final), USITC Pub. 4604 at 9-11 (April 2016).

[57] CR/PR at II-29 and Table II-10. The one responding chemical grade end user reported silicon metal from domestic and all subject country pairs was sometimes interchangeable. *Id*.

[58] CR/PR at II-29 and Table II-10.

from each of the subject countries.[59] Domestically produced silicon metal and subject imports were sold in the secondary aluminum market, albeit in varying degrees.[60] We recognize that since subject imports are typically not sold to chemical end users, there is more limited interchangeability in this market sector.[61]

Channels of Distribution. The majority of U.S. producers' U.S. commercial shipments were sold to chemical end users, ranging from *** percent for the 2018 to 2020 period, but a meaningful share, from *** percent, was sold to secondary aluminum end users. The majority of imports from Iceland, Kazakhstan, and Malaysia, were sold to secondary aluminum end users.[62] For Bosnia and Herzegovina, between *** percent of U.S. importers' U.S. commercial shipments were sold to secondary aluminum end users with the remainder sold to distributors. Responses from the importers and producers indicate that most sales to distributors are ultimately sold to secondary aluminum end users, although some may be sold to other metallurgical end users.[63]

Geographic Overlap. U.S. producers reported selling silicon metal to ***.[64] Importers also reported selling to all regions of the contiguous United States, except the Mountain region.[65] Official import statistics indicate a geographic overlap with respect to borders of entry between imports from all four subject countries in the Eastern border, which accounted for 93.1 percent of subject imports in 2020.[66]

Simultaneous Presence in Market. Official import statistics indicate that U.S. imports of silicon metal from the subject countries were present throughout the January 2018 to December 2020 period of investigation.[67] Imports from Bosnia and Herzegovina were present for 35 months of the 36-month period, imports from Iceland were present for 31 months,

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[59] CR/PR at II-16.

[60] CR/PR at Table II-1. The record indicates that the domestic industry lost sales to subject imports during the POI, further suggesting fungibility. *See* CR/PR at V-22 (15 of 20 responding metallurgical end-user purchasers reported that they purchased or imported subject imports rather than the domestic product since 2018; eight of these purchasers reported that price was a primary reason for the decision to purchase subject imports rather than the domestic product).

[61] CR/PR at II-16. Of the four chemical end user questionnaire responses, two compared only U.S. and nonsubject product, reporting that these were frequently interchangeable; one chemical end user ***. CR/PR at II-29.

[62] CR/PR at Table II-1. The share of U.S. importers' U.S. commercial shipments that are sold to the secondary aluminum market are *** percent of U.S. importers' U.S. commercial shipments from Iceland; *** percent of U.S. importers' U.S. commercial shipments from Kazakhstan; and *** percent of U.S. importers' U.S. commercial shipments from Malaysia. *Id*.

[63] CR/PR at II-4. Responding importers ***. *Id*.

[64] CR/PR at II-6, Table II-2.

[65] CR/PR at II-6, Table II-2. The only importer responding for Bosnia and Herzegovina (MTALX) was unable to report the regions into which its product was sold. *Id*. at Table II-2 note.

[66] CR/PR at Table IV-7.

[67] CR/PR at IV-18, Table IV-8.

imports from Kazakhstan were present for 23 months, and imports from Malaysia were present for 20 months.[68] Further, imports from all subject sources were present in each year of the POI, with the exception of Malaysia; imports from Malaysia were present in the market in every month from April of 2019 through November of 2020.[69]

Conclusion. The petitions were filed on the same day thereby satisfying the threshold requirement for cumulation. The record indicates that for metallurgical end uses of silicon metal there is fungibility between subject imports from each subject country and the domestic like product. Moreover, the record indicates a reasonable overlap among subject sources and the domestic like product in terms of channels of distribution for the secondary aluminum market, geographic markets, and simultaneous presence in the U.S. market.

In light of the foregoing, we find that there is a reasonable overlap of competition between the domestic like product and imports from each subject country and between imports from each subject country. Accordingly, we analyze subject imports from Bosnia and Herzegovina, Iceland, Kazakhstan, and Malaysia on a cumulated basis for our analysis of whether the domestic industry is materially injured by reason of subject imports.

V. Material Injury by Reason of Subject Imports

Based on the record in the final phase of these investigations, we find that an industry in the United States is materially injured by reason of subject imports from Bosnia and Herzegovina and from Iceland that Commerce has found to be sold in the United States at less than fair value, and by reason of subject imports from Kazakhstan that Commerce has found to be subsidized by the government of Kazakhstan.

A. Legal Standards

In the final phase of antidumping and countervailing duty investigations, the Commission determines whether an industry in the United States is materially injured or threatened with material injury by reason of the imports under investigation.[70] In making this determination, the Commission must consider the volume of subject imports, their effect on prices for the domestic like product, and their impact on domestic producers of the domestic like product, but only in the context of U.S. production operations.[71] The statute defines "material injury" as "harm which is not inconsequential, immaterial, or unimportant."[72] In assessing whether the domestic industry is materially injured by reason of subject imports, we

[68] CR/PR at IV-18, Table IV-8.

[69] CR at Table IV-8.

[70] 19 U.S.C. §§ 1671d(b), 1673d(b).

[71] 19 U.S.C. § 1677(7)(B). The Commission "may consider such other economic factors as are relevant to the determination" but shall "identify each {such} factor ... and explain in full its relevance to the determination." 19 U.S.C. § 1677(7)(B).

[72] 19 U.S.C. § 1677(7)(A).

consider all relevant economic factors that bear on the state of the industry in the United States.[73] No single factor is dispositive, and all relevant factors are considered "within the context of the business cycle and conditions of competition that are distinctive to the affected industry."[74]

Although the statute requires the Commission to determine whether the domestic industry is "materially injured or threatened with material injury by reason of" unfairly traded imports,[75] it does not define the phrase "by reason of," indicating that this aspect of the injury analysis is left to the Commission's reasonable exercise of its discretion.[76] In identifying a causal link, if any, between subject imports and material injury to the domestic industry, the Commission examines the facts of record that relate to the significance of the volume and price effects of the subject imports and any impact of those imports on the condition of the domestic industry. This evaluation under the "by reason of" standard must ensure that subject imports are more than a minimal or tangential cause of injury and that there is a sufficient causal, not merely a temporal, nexus between subject imports and material injury.[77]

In many investigations, there are other economic factors at work, some or all of which may also be having adverse effects on the domestic industry. Such economic factors might include nonsubject imports; changes in technology, demand, or consumer tastes; competition among domestic producers; or management decisions by domestic producers. The legislative history explains that the Commission must examine factors other than subject imports to ensure that it is not attributing injury from other factors to the subject imports, thereby inflating an otherwise tangential cause of injury into one that satisfies the statutory material injury threshold.[78] In performing its examination, however, the Commission need not isolate

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[73] 19 U.S.C. § 1677(7)(C)(iii).

[74] 19 U.S.C. § 1677(7)(C)(iii).

[75] 19 U.S.C. §§ 1671d(b), 1673d(b).

[76] *Angus Chemical Co. v. United States*, 140 F.3d 1478, 1484-85 (Fed. Cir. 1998) ("{T}he statute does not 'compel the commissioners' to employ {a particular methodology}."), *aff'g,* 944 F. Supp. 943, 951 (Ct. Int'l Trade 1996).

[77] The Federal Circuit, in addressing the causation standard of the statute, observed that "{a}s long as its effects are not merely incidental, tangential, or trivial, the foreign product sold at less than fair value meets the causation requirement." *Nippon Steel Corp. v. USITC*, 345 F.3d 1379, 1384 (Fed. Cir. 2003). This was further ratified in *Mittal Steel Point Lisas Ltd. v. United States*, 542 F.3d 867, 873 (Fed. Cir. 2008), where the Federal Circuit, quoting *Gerald Metals, Inc. v. United States*, 132 F.3d 716, 722 (Fed. Cir. 1997), stated that "this court requires evidence in the record 'to show that the harm occurred "by reason of" the LTFV imports, not by reason of a minimal or tangential contribution to material harm caused by LTFV goods.'" *See also Nippon Steel Corp. v. United States*, 458 F.3d 1345, 1357 (Fed. Cir. 2006); *Taiwan Semiconductor Industry Ass'n v. USITC*, 266 F.3d 1339, 1345 (Fed. Cir. 2001).

[78] SAA at 851-52 ("{T}he Commission must examine other factors to ensure that it is not attributing injury from other sources to the subject imports."); S. Rep. 96-249 at 75 (1979) (the Commission "will consider information which indicates that harm is caused by factors other than less-
(Continued...)

the injury caused by other factors from injury caused by unfairly traded imports.[79] Nor does the "by reason of" standard require that unfairly traded imports be the "principal" cause of injury or contemplate that injury from unfairly traded imports be weighed against other factors, such as nonsubject imports, which may be contributing to overall injury to an industry.[80] It is clear that the existence of injury caused by other factors does not compel a negative determination.[81]

Assessment of whether material injury to the domestic industry is "by reason of" subject imports "does not require the Commission to address the causation issue in any particular way" as long as "the injury to the domestic industry can reasonably be attributed to the subject imports."[82] The Commission ensures that it has "evidence in the record" to "show that the

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than-fair-value imports."); H.R. Rep. 96-317 at 47 (1979) ("in examining the overall injury being experienced by a domestic industry, the ITC will take into account evidence presented to it which demonstrates that the harm attributed by the petitioner to the subsidized or dumped imports is attributable to such other factors;" those factors include "the volume and prices of nonsubsidized imports or imports sold at fair value, contraction in demand or changes in patterns of consumption, trade restrictive practices of and competition between the foreign and domestic producers, developments in technology and the export performance and productivity of the domestic industry"); *accord Mittal Steel*, 542 F.3d at 877.

[79] SAA at 851-52 ("{T}he Commission need not isolate the injury caused by other factors from injury caused by unfair imports."); *Taiwan Semiconductor Industry Ass'n,* 266 F.3d at 1345 ("{T}he Commission need not isolate the injury caused by other factors from injury caused by unfair imports ... . Rather, the Commission must examine other factors to ensure that it is not attributing injury from other sources to the subject imports." (emphasis in original)); *Asociacion de Productores de Salmon y Trucha de Chile AG v. United States*, 180 F. Supp. 2d 1360, 1375 (Ct. Int'l Trade 2002) ("{t}he Commission is not required to isolate the effects of subject imports from other factors contributing to injury" or make "bright-line distinctions" between the effects of subject imports and other causes.); *see also Softwood Lumber from Canada*, Inv. Nos. 701-TA-414 and 731-TA-928 (Remand), USITC Pub. 3658 at 100-01 (Dec. 2003) (Commission recognized that "{i}f an alleged other factor is found not to have or threaten to have injurious effects to the domestic industry, *i.e*., it is not an 'other causal factor,' then there is nothing to further examine regarding attribution to injury"), *citing Gerald Metals,* 132 F.3d at 722 (the statute "does not suggest that an importer of LTFV goods can escape countervailing duties by finding some tangential or minor cause unrelated to the LTFV goods that contributed to the harmful effects on domestic market prices.").

[80] S. Rep. 96-249 at 74-75; H.R. Rep. 96-317 at 47.

[81] *See Nippon Steel Corp*., 345 F.3d at 1381 ("an affirmative material-injury determination under the statute requires no more than a substantial-factor showing. That is, the 'dumping' need not be the sole or principal cause of injury.").

[82] *Mittal Steel*, 542 F.3d at 876 &78; *see also id.* at 873 ("While the Commission may not enter an affirmative determination unless it finds that a domestic industry is materially injured 'by reason of' subject imports, the Commission is not required to follow a single methodology for making that determination ... {and has} broad discretion with respect to its choice of methodology.") *citing United States Steel Group v. United States*, 96 F.3d 1352, 1362 (Fed. Cir. 1996) and S. Rep. 96-249 at 75. In its decision in *Swiff-Train v. United States*, 793 F.3d 1355 (Fed. Cir. 2015), the Federal Circuit affirmed the Commission's causation analysis as comporting with the Court's guidance in *Mittal*.

harm occurred 'by reason of' the LTFV imports," and that it is "not attributing injury from other sources to the subject imports." [83] The Federal Circuit has examined and affirmed various Commission methodologies and has disavowed "rigid adherence to a specific formula."[84]

The question of whether the material injury threshold for subject imports is satisfied notwithstanding any injury from other factors is factual, subject to review under the substantial evidence standard.[85] Congress has delegated this factual finding to the Commission because of the agency's institutional expertise in resolving injury issues.[86]

B. Conditions of Competition and the Business Cycle

The following conditions of competition inform our analysis of whether there is material injury by reason of subject imports.

1. Captive Production

We first consider the applicability of the statutory captive production provision.[87] While U.S. producers reported no internal consumption of silicon metal, assuming *arguendo* that

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[83] *Mittal Steel*, 542 F.3d at 873 (quoting from *Gerald Metals*, 132 F.3d at 722), 877-79. We note that one relevant "other factor" may involve the presence of significant volumes of price-competitive nonsubject imports in the U.S. market, particularly when a commodity product is at issue. In appropriate cases, the Commission collects information regarding nonsubject imports and producers in nonsubject countries in order to conduct its analysis.

[84] *Nucor Corp. v. United States*, 414 F.3d 1331, 1336, 1341 (Fed. Cir. 2005); *see also Mittal Steel*, 542 F.3d at 879 ("*Bratsk* did not read into the antidumping statute a Procrustean formula for determining whether a domestic injury was 'by reason' of subject imports.").

[85] We provide in our discussion below a full analysis of other factors alleged to have caused any material injury experienced by the domestic industry.

[86] *Mittal Steel*, 542 F.3d at 873; *Nippon Steel Corp*., 458 F.3d at 1350, *citing U.S. Steel Group*, 96 F.3d at 1357; S. Rep. 96-249 at 75 ("The determination of the ITC with respect to causation is ... complex and difficult, and is a matter for the judgment of the ITC.").

[87] CR/PR at III-13. The captive production provision, 19 U.S.C. § 1677(7)(C)(iv), as amended by the Trade Preferences Extension Act of 2015, provides:

(iv) CAPTIVE PRODUCTION – If domestic producers internally transfer significant production of the domestic like product for the production of a downstream article and sell significant production of the domestic like product in the merchant market, and the Commission finds that-

(I) the domestic like product produced that is internally transferred for processing into that downstream article does not enter the merchant market for the domestic like product, and

(II) the domestic like product is the predominant material input in the production of that downstream article.

(Continued...)

transfers to related firms in this case meet the criteria for internal transfers, we determine that the threshold criterion for application of the captive production provision has been met.[88]

The first statutory criterion focuses on whether any of the domestic like product that is transferred internally for further processing is in fact sold on the merchant market.[89] Approximately *** percent of U.S. producers' transfers to related firms during 2020 were sold as silicon metal and the remainder were processed into other products.[90] Accordingly, we find that the first criterion has not been met.

When applying the second statutory criterion, we generally consider whether the domestic like product is the predominant material input into a downstream product by referring to its share of the raw material cost of the downstream product.[91] We also find that the second criterion has not been met; silicon metal reportedly comprised only *** percent for a weighted average of *** percent of the finished cost of downstream products for which information was reported.[92]

Accordingly, we find that the captive production provision does not apply, and will focus our analysis on the overall silicon metal market in analyzing the market share and financial performance of the domestic industry.

The SAA indicates that where a domestic like product is transferred internally for the production of another article coming within the definition of the domestic like product, such transfers do not constitute internal transfers for the production of a "downstream article" for purposes of the captive production provision. SAA at 853.

[88] The *** of the quantity of U.S. producers' total shipments of the domestic like product during the POI were commercial U.S. shipments: *** percent in 2018, *** percent in 2019, *** percent in 2020. CR/PR at Table III-6. A *** percentage of the quantity of U.S. producers' total shipments of the domestic like product during the POI was reported as transfers to related firms: *** percent in 2018, *** percent in 2019, and *** percent in 2020. There were *** shipments reported as internal consumption. *Id*. The definition of an "internal transfer" for purposes of the captive production provision was addressed in *Bethlehem Steel Corp. v. United States*, 294 F. Supp. 2d 1359, 1364-1368 (Ct. Int'l Trade 2003). We assume for purposes of this discussion that the internal transfers reported in this case satisfy this definition.

[89] *See*, *e.g.*, *Hot-Rolled Steel Products from Argentina and South Africa*, Inv. Nos. 701-TA-404, 731-TA-898, 905 (Final), USITC Pub. 3446 at 15-16 (Aug. 2001); *Certain Cold-Rolled Steel Products from Argentina, Brazil, China, Indonesia, Japan, Russia, Slovakia, South Africa, Taiwan, Turkey and Venezuela*, Inv. Nos. 701-TA-393 and 731-TA-829-40 (Final) (Remand), USITC Pub. 3691 at 2 & n.19 (May 2004).

[90] CR/PR at III-13-14.

[91] *See generally, e.g., Polyethylene Terephthalate Film, Sheet and Strip from Brazil, China, Thailand, and the United Arab Emirates*, Inv. Nos. 731-TA-1131-1134 (Final), USITC Pub. 4040 at 17 n.103 (October 2008). The Commission has construed "predominant" material input to mean the main or strongest element, and not necessarily a majority, of the inputs by value. *See Polyvinyl Alcohol from Germany and Japan*, Inv. Nos. 731-TA-1015-16 (Final), USITC Pub. 3604 at 15 n.69 (June 2003).

[92] CR/PR at Table III-10.

2. Demand Considerations

Chemical producers, producers of primary aluminum (produced from ore), and producers of secondary aluminum (produced from scrap) are the principal end users of silicon metal.[93] The primary drivers of demand are the demand for silicon-based chemicals and aluminum alloys.[94] In the chemical sector, silicon metal is used to produce polysilicon and silicones, which are used in a variety of applications such as adhesives, resins, and lubricants.[95] In the metallurgical sector, silicon metal is used as an alloying agent in aluminum. Silicon metal purchased by distributors tends to be of the type sold to metallurgical end users, primarily if not entirely to secondary aluminum producers, and is unlikely to be sold to chemical end users.[96]

Apparent U.S. consumption by quantity decreased each year of the POI totaling *** short tons of contained silicon in 2018, *** short tons of contained silicon in 2019 and *** short tons of contained silicon in 2020, for an overall decrease of *** percent over the POI.[97] However, the quantity of U.S. shipments to aluminum end users increased from 2018 to 2019, before decreasing in 2020.[98] Market participants' perception of demand during the POI was mixed. U.S. producers and a majority of importers reported that demand fluctuated or decreased during the POI.[99] A plurality of metallurgical end-user purchasers reported no change in demand,[100] while half of the responding chemical end-user purchasers reported that demand fluctuated.[101]

3. Supply Considerations

The domestic industry accounted for the largest share of the U.S. silicon metal market during the POI. Its share of the quantity of apparent U.S. consumption generally declined over

[93] CR/PR at I-11.

[94] CR/PR at II-1.

[95] CR/PR at III-14.

[96] CR/PR at II-4.

[97] CR/PR at IV-21 and Table IV-9. Combined U.S. producers' and importers' shipments to aluminum end users were *** short tons in 2018, *** short tons in 2019, and *** short tons in 2020. CR/PR at Table D-1.

[98] *See* CR/PR at Table D-1.

[99] CR/PR at Table II-4. With regard to the COVID-19 pandemic, Petitioners assert that demand for silicon metal in the aluminum sector initially dropped as the auto industry reduced production, while demand for silicon metal in the chemical sector was largely unchanged overall as demand for some products increased balancing decreased demand for others. CR/PR at II-14.

[100] CR/PR at Table II-4.

[101] CR/PR at Table II-4.

the POI. It was *** percent in 2018, *** percent in 2019, and *** percent in 2020, for an overall decline of *** percentage points.[102]

Cumulated subject imports' market share by quantity increased from *** percent in 2018 to *** percent in 2019, then declined to *** percent in 2020, for an overall increase of *** percentage points.[103]

Nonsubject imports' market share by quantity was *** percent in 2018, *** percent in 2019, and *** percent in 2020.[104] The largest sources of nonsubject imports during the POI were Brazil, Canada, and Norway.[105]

Importers and purchasers reported supply constraints over the POI for both domestic and imported sources.[106] While no domestic producers reported supply constraints, domestic producers reported plant closings, prolonged shutdowns, and curtailments during the POI.[107] The domestic industry reported excess capacity in each year of the POI.[108]

4. Substitutability and Other Conditions

We find that for metallurgical end users there is a high degree of substitutability between domestically produced silicon metal and subject imports. For chemical end users, which typically purchase silicon metal from U.S. or nonsubject sources rather than silicon metal from subject sources, there is a lower degree of substitutability between the domestic product and subject imports.[109] Different market sectors generally require different chemistry of the silicon metal that they purchase so that silicon metal required by one type of user may not be

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[102] CR/PR at Table IV-10. Domestic producers supplied *** short tons of contained silicon to aluminum end users in 2018, *** short tons in 2019, and *** short tons in 2020, accounting for *** percent of the share of U.S. shipments to these end users in 2018, *** percent in 2019, and *** percent in 2020. CR/PR at Table D-1. Domestic producers supplied *** short tons of contained silicon to polysilicon end users in 2018, *** short tons in 2019, and *** short tons in 2020, accounting for *** percent of the share of U.S. shipments to these end users in 2018, *** percent in 2019, and *** percent in 2020. *Id.* at Table D-2.

[103] CR/PR at Table IV-10. Cumulated subject imports supplied *** short tons of contained silicon to aluminum end users in 2018, *** short tons in 2019, and *** short tons in 2020, accounting for *** percent of the share of U.S. shipments to these end users in 2018, *** percent in 2019, and *** percent in 2020. CR/PR at Table D-1.

[104] CR/PR at Table IV-10.

[105] CR/PR at II-11.

[106] CR/PR at II-11-II-12. PCC argues that 13 importers and 10 purchasers reported domestic supply constraints during the POI. PCC Posthearing Brief at 9. Petitioner notes that ***. Petitioners' Final Comments at 5.

[107] CR/PR at Table III-3. One U.S. producer, ***. CR/PR at Table III-3.

[108] The domestic industry's capacity was *** short tons in 2018, *** short tons in 2019, and *** short tons in 2020. CR/PR at Table III-4.

[109] CR/PR at II-3.

readily substituted for silicon metal required by a different type of user.[110] At the same time, there appears to be some overlap in the specifications for silicon metal for chemical and aluminum end uses.[111]

Notwithstanding differences between different specifications, two responding producers reported that silicon metal from all country pairs were always interchangeable with each other and domestically produced product,[112] while most importers reported that product from all country pairs was frequently or sometimes interchangeable, and that subject imports and the domestically produced product were sometimes interchangeable.[113] Most purchasers of silicon metal for metallurgical end uses[114] reported that imports of silicon metal from all country pairs was always interchangeable with each other and domestically produced product. Only one purchaser of silicon metal for chemical end uses responded to the question regarding interchangeability of subject imports, reporting that subject imports of silicon metal from all country pairs were sometimes interchangeable with each other and domestically produced product.[115]

We find that price is one of the important factors in purchasing decisions for silicon metal, particularly amongst metallurgical end users. Price was among the most often cited top-three factors considered in purchasing decisions by metallurgical and chemical end users.[116] Petitioners note that the availability of published price data ensures that pricing is relatively

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[110] Petitioners assert that the description of silicon metal by grade is a misnomer, and that there is not a grade that covers the same specification for all customers in one given segment. They assert that silicon metal can instead be described by specifications and that "each customer in the chemical industry and different customers in the primary aluminum segment and in the secondary aluminum segment use different specifications of silicon metal". Hearing Transcript ("Tr."). at 26, 45-47 (Bowes, Lage). Petitioners explain that 553 "grade" is a specification for amounts of iron, calcium and aluminum and that while this "grade" is referred to as "secondary aluminum grade," secondary aluminum producers also use other specifications and some chemical end users also use 553 "grade" though that would be less common and chemical end user would have "a much more detailed specification." Hearing Tr. At 47-48 (Lage).

[111] CR/PR at I-13-14; Hearing Tr. at 46-47 (Bowes, Lage).

[112] CR/PR at II-29 and Table II-10.

[113] CR/PR at II-29 and Table II-10.

[114] Metallurgical end users includes primary and secondary aluminum end users but also includes other metallurgical end users. *See* CR/PR at II-2 (concerning "other" purchasers).

[115] CR/PR at Table II-10.

[116] CR/PR at Table II-6. Price was the most frequently reported third-most important factor by purchasers overall, ranked behind quality/chemistry, which was frequently reported as the first- or second-most important factor. Metallurgical end users most frequently reported quality/chemistry as the first-most important factor and price as the second-most important factor. All four chemical end users reported either quality/chemistry or availability/delivery/reliability of supply as either the first-most or second-most important factor and three of the four reported price as the third-most important factor. *Id.*

transparent and quickly communicated throughout the market.[117] Half of metallurgical end users (10 of 20) reported that they usually purchase the lowest-priced product; seven sometimes purchase the lowest-priced product; two never purchase the lowest-priced product; and one always purchases the lowest-priced product.[118] Chemical end users' responses were mixed, with half (2 of 4) reporting that they usually purchase the lowest-priced product, and half reporting that they never purchase the lowest-priced product.[119]

Most U.S. producers and importers reported mainly using transaction by transaction negotiations and contracts for determining sales prices.[120] U.S. producers and importers reported selling most of their silicon metal under annual contracts.[121] Most purchasers reported that they referred to or relied on published price data – either CRU or Platts indices – when negotiating spot or contract prices.[122] Silicon metal purchasers will sometimes require producers to go through a qualification process.[123]

Domestically produced silicon metal is primarily produced-to-order (*** percent of domestic producers' commercial shipments). The remainder of domestic producers' commercial shipments came from inventories, with lead times averaging *** days.[124] Importers reported that *** percent of their commercial shipments were from inventories, with lead times averaging *** days. Additionally, *** percent came from overseas inventories with lead times averaging *** days, and *** percent was produced-to-order with lead times averaging *** days.[125]

The main raw material used to produce silicon metal is mined quartzite.[126] U.S. producers reported that raw materials as a share of the cost of goods sold ("COGS") decreased

[117] Hearing Tr. at 27 (Bowes). The published price series data most commonly used in the silicon metal industry are for 553 grade silicon metal sold in the U.S. spot market provided by Platts and CRU. CR/PR at V-3, V-4; WPNA Prehearing Br., Exhibit 2. While this grade is most commonly used by secondary aluminum producers, purchasers in the primary aluminum and chemical sectors also refer to these indices in their negotiations, as discussed below. CR/PR at V-3, V-4; Hearing Tr. at 47-48 (Lage).

[118] CR/PR at II-20.

[119] CR/PR at II-20.

[120] CR/PR at Table V-1.

[121] CR/PR at V-5, Table V-2.

[122] CR/PR at V-4.

[123] Hearing Tr. at 25 (Bowes). A representative for RS Silicon asserts that while some end users, such as secondary aluminum grade silicon metal users, have comparably less stringent quality specifications for silicon metal, they maintain stringent qualification and certification processes. Hearing Tr. at 122-123 (Heffner).

[124] CR/PR at II-17.

[125] CR/PR at II-17.

[126] CR/PR at V-1.

from *** percent in 2018 to *** percent in 2020.[127] The cost of electricity is another important cost in the production of silicon metal, and this cost fluctuated during the POI.[128]

C. Volume of Subject Imports

Section 771(7)(C)(i) of the Tariff Act provides that the "Commission shall consider whether the volume of imports of the merchandise, or any increase in that volume, either in absolute terms or relative to production or consumption in the United States, is significant."[129]

The volume of cumulated subject imports increased overall during the POI. The volume of cumulated subject imports by quantity increased from *** short tons in 2018 to *** short tons in 2019 and declined to *** short tons in 2020, for an overall increase of 86.9 percent during the POI.[130] Cumulated subject imports also increased from 2018 to 2020 relative to U.S. consumption. Cumulated subject imports' share of the U.S. market by quantity was *** percent in 2018, *** percent in 2019, and *** percent in 2020.[131]

We find that the volume of the cumulated subject imports and the increase in volume from 2018 to 2020 are significant both in absolute terms and relative to consumption in the United States.

D. Price Effects of the Subject Imports

Section 771(7)(C)(ii) of the Tariff Act provides that, in evaluating the price effects of the subject imports, the Commission shall consider whether

> (I) there has been significant price underselling by the imported merchandise as compared with the price of domestic like products of the United States, and
>
> (II) the effect of imports of such merchandise otherwise depresses prices to a significant degree or prevents price increases, which otherwise would have occurred, to a significant degree.[132]

As previously discussed, we find that the domestic like product and cumulated subject imports have a high degree of substitutability for metallurgical end uses but a lower degree for chemical end uses, and that price is an important factor in purchasing decisions for silicon metal.

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[127] CR/PR at Table VI-1.
[128] CR/PR at V-1, Fig. V-1.
[129] 19 U.S.C. § 1677(7)(C)(i).
[130] CR/PR at Table IV-2.
[131] CR/PR at Table IV-10.
[132] 19 U.S.C. § 1677(7)(C)(ii).

The Commission collected quarterly price data on three silicon metal products.[133] Three U.S. producers and four importers provided usable pricing data for sales of the requested products, although not all firms reported pricing for all products for all quarters. The data collected account for *** percent of U.S. producers' commercial shipments and *** percent of their total U.S. shipments (including transfers to related firms). The data collected account for *** U.S. shipments of cumulated subject imports.[134]

The pricing data indicate that cumulated subject imports were priced below domestically produced product in 41 of 43 instances[135] (comprising imports of *** short tons of contained silicon) and oversold the domestic product in the remaining two instances (comprising imports of *** short tons of contained silicon) during the POI.[136] The margins of underselling ranged from *** to *** percent.[137] Of the 20 responding metallurgical end-user purchasers, 15 reported that they purchased or imported subject

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[133] CR/PR at V-9.

Product 1.-- Sold to primary aluminum producers; silicon metal less than 99.99% pure that contains a minimum of 98.5% silicon, a maximum of 1.00% iron, a maximum of 0.07% calcium, and no restriction of the aluminum content.

Product 2.-- Sold to secondary aluminum producers; silicon metal less than 99.99% pure that contains a minimum of 97.0% silicon, a maximum of 2.00% iron, a maximum of 0.4% calcium, and no restriction of the aluminum content.

Product 3.-- Sold to chemical and/or polysilicon manufacturers; silicon metal less than 99.99% pure that contains a minimum of 98.0% silicon, a maximum of 1.50% iron, a maximum of 0.2% calcium, and a maximum of 0.4% aluminum. *Id*.

[134] CR/PR at V-9. The data account for *** percent of U.S. shipments of subject imports from Bosnia and Herzegovina, *** percent from Iceland, *** percent from Kazakhstan, and *** percent from Malaysia. *Id*.

[135] The pricing data allowed comparisons in 43 out of a possible 144 comparisons. There were no reported U.S. importer shipments for pricing product 3 and only two quarters of reported U.S. importer shipments for pricing product 1. *See* CR/PR at V-9.

[136] CR/PR at V-19, Table V-7. RS Silicon argues that the Commission should exclude the pricing data of ***, because these data are for sales to distributors and thus would be expected to be lower-priced than the sales to end users that comprise the remainder of the data. *See* RS Silicon Posthearing Br. at 5-7. The data at Appendix F exclude *** and show that subject imports undersold the domestic like product in 21 of 31 instances, accounting for *** percent of the quantity of reported subject imports. CR/PR at App. F, F-7. We find these data are consistent with a finding of significant underselling.

In addition to arguing for exclusion, RS Silicon also provided adjusted pricing data for ***. We find RS Silicon's proposed adjustments to be speculative as they are based solely on assumptions by RS Silicon on how *** would have priced these shipments, rather than on evidence of ***'s actual pricing practices. Therefore we do not consider there to be a basis to include them in our calculations. *See* RS Silicon Posthearing Br. at 8-9. We similarly do not find Petitioners' adjusted price data for *** to be probative. *See* Petitioners' Posthearing Brief at 67-68.

[137] CR/PR at V-19.

imports rather than the domestic product since 2018, and ten of these purchasers reported that subject import prices were lower than those of U.S. producers.[138] Eight of these purchasers reported that price was a primary reason for their decision to purchase subject imports rather than the domestic product, for a total estimated quantity of lost sales to the domestic industry of *** short tons of contained silicon.[139]

The pricing and lost sales data consequently show that cumulated subject imports were recurrently priced lower than the domestic like product. Purchaser responses also indicate that the lower prices of the subject imports enabled them to take sales from the domestic industry within the metallurgical sector, which is consistent with our findings of the substitutability of the domestic like product and cumulated subject imports and the importance of price in purchasing decisions. In light of these considerations, we find that there has been significant price underselling of the domestic like product by subject imports.

We have also considered price trends for the domestic like product and subject imports during the POI. In general, U.S. producers' prices decreased by *** percent between 2018 and 2020 for all pricing products.[140] The overlap in sales between subject imports and domestic like product is strong in pricing product 2. Domestic prices for product 2 (silicon metal sold to secondary aluminum producers) decreased by *** percent from 2018 to 2020, with most of that decrease occurring from 2018 to 2019, when U.S. importers' U.S. shipments of subject imports to aluminum producers more than doubled.[141] Subject imports' prices for product 2 from each subject country also decreased during the POI.[142]

Although subject imports were generally limited to silicon metal sold to secondary aluminum users, their price-depressing impact extended beyond that segment. As noted above, the published price indices for metallurgical grade silicon metal are readily available and are reported to be used by most purchasers as part of spot and contract negotiations with suppliers.[143] The record indicates that the prices published in these indices are based on sales of 553 grade silicon metal on the spot market.[144] These indices are primarily determined by sales to the secondary aluminum sector as 553 grade is most commonly used by secondary aluminum end users and sales to the secondary

[138] CR/PR at Table V-9.

[139] CR/PR at Table V-9. This quantity was equivalent to *** percent of total reported purchases of subject imports during the POI. CR/PR at Table V-8, V-9.

[140] CR/PR at Table V-6.

[141] U.S. importers' U.S. shipments of subject imports to aluminum producers increased from *** short tons in 2018 to *** short tons in 2019. CR/PR at App. D, D-3.

[142] CR/PR at Table V-6.

[143] CR/PR at V-3.

[144] CR/PR at V-3.

aluminum sector tend to be spot sales.[145] Most purchasers reported that they referred to or relied on published price data when negotiating spot or contract prices. In particular, two of four responding U.S. chemical end use purchasers reported using the published price indices in their negotiations or agreements.[146] Thus, declines in prices for silicon metal destined for use by the secondary aluminum industry would have affected prices for other silicon metal products via their influence on published prices, and also to affect prices in future periods: U.S. producers and importers reported selling most of their silicon metal under annual contracts, which tended to fix both price and quantity and did not allow price renegotiation during contracts.[147] Domestic prices for silicon metal sold into the primary aluminum and chemical segments also declined over the POI, by *** and *** percent, respectively, and we find these decreases to be at least in part due to the depression of product 2 prices to which subject imports contributed.[148] [149]

Although declining consumption may be expected to put downward pressure on prices, we find the magnitude of the price decreases cannot be fully explained by declining demand alone. In a period of declining demand, increased volumes of low-priced imports would tend to exert additional downward pressure on prices, and in this

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[145] Hearing Tr. at 49-50 (Bowes, Klett).

[146] CR/PR at V-4. Seventeen of 24 responding purchasers reported they referred to or relied on published price indices (15 of 20 metallurgical end users and 2 of 4 chemical end users). Eight purchasers reported referring to or relying on published price information for their spot purchases and 14 reported referring to or relying on this information for their contract purchases. Thirteen firms reported using Platts, others listed CRU, and one listed "Argus Media." *Id*.; s*ee also* Petitioner's Prehearing Brief at 30 ("Prices published by CRU, Platts, or Ryan's Notes, reflecting transactions in the secondary aluminum market, are then used to establish prices for sales to customers in the polysilicon/chemical and primary aluminum segments of the U.S. silicon metal market, and influence both spot market and contract prices in those market segments."). One of the purchasers that reported not using these indices reported that it does "additionally take into account indices (Platts) sometimes when negotiating with suppliers". CR/PR at V-4. Some market participants indexed sales to prices reported in the indices, while others only referred to them in negotiations. In terms of indexing, *** and two of the four responding importers reported that their one-year contracts are indexed to the published price of silicon metal. CR/PR at V-5. ***. *Id*.; s*ee also* Petitioners' Prehearing Br., Exhibit 4 (summarizing questionnaire responses of purchasers outside the secondary aluminum sector using published price indices); Petitioners' Posthearing Br. Answers to Questions at 48, and Exhibits 8, 16-18 (showing the use of the published price indices in *** contracts with customers outside of the secondary aluminum market).

[147] CR/PR at V-5 and Table V-2.

[148] CR/PR at Table V-6.

[149] Of the 21 responding purchasers to the lost revenue survey, two of seven metallurgical end users reported that U.S. producers decreased prices in order to compete with lower-priced subject imports; the other five responding metallurgical purchasers reported that U.S. producers had not reduced prices to compete with subject imports. CR/PR at V-26 and Table V-11.

case we see that there were substantial declines in the prices of domestic and subject imports during the period of investigation particularly in pricing product 2, where subject imports were most concentrated and undersold the domestic product to a significant degree.[150] Moreover, sales of low-priced subject imports have depressed the published price indices used by U.S. producers and importers to negotiate spot and contract prices in all market segments.[151] On this basis, we find that the significant volume of subject imports depressed the prices of the domestic product to a significant degree.

The domestic industry's average COGS to net sales ratio increased each year of the POI, and surpassed *** percent in both 2019 and 2020, as the domestic industry's unit COGS rose while its unit net sales value declined over the POI.[152] These increases reflect substantial declines in net sales, unit values, and quantities. [153] At the same time, apparent U.S. consumption declined by *** percent from 2018 to 2019 and by an additional *** percent from 2019 to 2020, for an overall decrease of *** percent.

Given the importance of price in purchasing decisions and substitutability of the products, we find that the significant underselling by cumulated subject imports caused the domestic industry to lose sales and market share from 2018 to 2020. Moreover, the significant volume of cumulated subject imports depressed domestic prices to a significant degree. We therefore find that the cumulated subject imports had significant effects on prices for the domestic like product.

E. Impact of the Subject Imports[154]

Section 771(7)(C)(iii) of the Tariff Act provides that examining the impact of subject imports, the Commission "shall evaluate all relevant economic factors which have a bearing on

[150] CR/PR at Table V-4; *see also id.* at Figs. V-5 & V-6.

[151] Over the POI subject imports represented a significant and growing share of the secondary aluminum segment of the market. CR/PR at Table D-1. As discussed above, within this segment of the market subject imports undersold the domestic like product, in almost all comparisons. Given that and the fact that published price indices primarily reflect sales within this segment of the market, subject imports had a depressing effect on these indices.

[152] CR/PR at Table VI-1. U.S. producers' average COGS to net sales ratio was *** percent in 2018, *** percent in 2019, and *** percent in 2020. *Id*.

[153] The industry's sales volumes and COGS were impacted by substantial environmental remediation charges and a production shutdown experienced by DC Alabama. *See, e.g.*, CR/PR at Table VI-1 Note, Table VI-3 Note, and VI-10-11. However, the COGS to net sales ratio for all three U.S. producers increased over the POI. CR/PR at Table VI-3.

[154] The statute instructs the Commission to consider the "magnitude of the dumping margin" in an antidumping proceeding as part of its consideration of the impact of imports. 19 U.S.C. § 1677(7)(C)(iii)(V). In its final determinations of sales at less than fair value Commerce found dumping margins of 21.41 percent for imports from Bosnia and Herzegovina; and from 37.83 to 47.54 percent for (Continued...)

the state of the industry."[155] These factors include output, sales, inventories, capacity utilization, market share, employment, wages, productivity, gross profits, net profits, operating profits, cash flow, return on investment, return on capital, ability to raise capital, ability to service debts, research and development, and factors affecting domestic prices. No single factor is dispositive and all relevant factors are considered "within the context of the business cycle and conditions of competition that are distinctive to the affected industry."[156]

The record in these investigations shows that most of the domestic industry's performance indicators declined from 2018 to 2020. The domestic industry's capacity decreased from *** short tons in 2018 to *** short tons in 2019 and *** short tons in 2020.[157] Despite its decreased capacity, capacity utilization also fell, from *** percent in 2018 to *** percent in 2019 and *** percent in 2020.[158] The production of silicon metal declined from *** short tons in 2018 to *** short tons in 2019 and *** short tons in 2020.[159]

The domestic industry's U.S. shipments also declined from *** short tons in 2018 to *** short tons in 2019 and *** short tons in 2020.[160] While apparent U.S. consumption declined during the POI, from *** short tons in 2018 to *** short tons in 2019 and *** short tons in 2020, the domestic industry also lost market share.[161] The domestic industry's market share by

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imports from Iceland. *Silicon Metal From Bosnia and Herzegovina and Iceland: Final Affirmative Determinations of Sales at Less than Fair Value and Final Affirmative Determination of Critical Circumstances for Iceland*, 86 Fed. Reg. 11720 (Feb. 26, 2021). In its preliminary determination in the trailing investigation, Commerce found dumping margins of 7.21 for subject imports from Malaysia. *Silicon Metal From Malaysia: Preliminary Affirmative Determination of Sales at Less Than Fair Value, Postponement of Final Determination, and Extension of Provisional Measures*, 86 Fed. Reg. 7701 (Feb. 1, 2021). We take into account in our analysis the fact that Commerce has made preliminary or final findings that all subject producers in Bosnia and Herzegovina, Iceland, and Malaysia are selling subject imports in the United States at less than fair value. In addition to this consideration, our impact analysis has considered other factors affecting domestic prices. Our analysis of the significant underselling of subject imports, described in the price effects discussion above, is particularly probative to an assessment of the impact of the subject imports.

[155] 19 U.S.C. § 1677(7)(C)(iii); *see also* SAA at 851 and 885 ("In material injury determinations, the Commission considers, in addition to imports, other factors that may be contributing to overall injury. While these factors, in some cases, may account for the injury to the domestic industry, they also may demonstrate that an industry is facing difficulties from a variety of sources and is vulnerable to dumped or subsidized imports.").

[156] 19 U.S.C. § 1677(7)(C)(iii). This provision was amended by the Trade Preferences Extension Act of 2015, Pub. L. 114-27.

[157] CR/PR at Table III-4.

[158] CR/PR at Table III-4.

[159] CR/PR at Table III-4.

[160] CR/PR at Table III-6.

[161] CR/PR at Table IV-10.

quantity decreased from *** percent in 2018 to *** percent in 2019, and was *** percent in 2020.[162]

The domestic industry's employment-related indicators also generally declined between 2018 and 2020. The number of production and related workers ("PRWs") declined from *** in 2018 to *** in 2019, and was *** in 2020.[163] Total hours worked followed a similar trend, decreasing from 2018 to 2019 and improving somewhat in 2020, for an overall decline during the period, although the hours worked per PRW declined each year of the period.[164] Total wages paid decreased from 2018 to 2019 and improved somewhat in 2020, for an overall decline during the period, while hourly wages increased each year of the POI.[165] Productivity fluctuated, initially increasing from 2018 to 2019 before decreasing in 2020, for an overall decline of *** percent during the period.[166] Unit labor costs increased each year of the period, for an overall increase of *** percent.[167]

Most of the domestic industry's financial performance indicators declined between 2018 and 2020. The domestic industry's net sales by value decreased each year of the POI, from *** in 2018 to *** in 2019 and *** in 2020, for an overall decline of *** percent.[168] Its gross profit, SG&A expenses, operating income, and net income also declined.[169] The domestic industry's gross profit decreased from $*** to *** in 2019 and *** in 2020.[170] Its operating income was $*** in 2018, *** in 2019, and *** in 2020.[171] Its net income dropped from $*** in 2018 to a *** in 2019 and a *** in 2020.[172] The domestic industry's COGS fluctuated, decreasing from 2018 to 2019 and increasing in 2020, for an overall decline during the

[162] CR/PR at Table IV-10. U.S. producers' inventories declined by *** percent over the POI. CR/PR at Table C-1.

[163] CR/PR at Table III-9.

[164] CR/PR at Table III-9. Total hours worked were *** in 2018, *** in 2019, and *** in 2020. Hours worked per PRW were *** in 2018, *** in 2019, and *** in 2020. *Id*.

[165] CR/PR at Table III-9. Total wages paid were $*** in 2018, $*** in 2019, and $*** in 2020. Hourly wages were $*** in 2018, $*** in 2019, and $*** in 2020. *Id*.

[166] CR/PR at Table III-9. Productivity, as measured by short tons contained silicon per 1,000 hours, was *** in 2018, *** in 2019, and *** in 2020. *Id*.

[167] CR/PR at III-12, Table III-9. Unit labor costs, as measured by dollars per short ton contained silicon, was $*** in 2018, $*** in 2019, and $*** in 2020. *Id*.

[168] CR/PR at Table VI-1.

[169] CR/PR at Table VI-1.

[170] CR/PR at Table VI-1.

[171] CR/PR at Table VI-1.

[172] CR/PR at Table VI-1.

period.[173] The average COGS to net sales ratio increased each year of the period, from *** percent in 2018 to *** percent in 2019 and *** percent in 2020.[174]

We recognize that the data on the industry as a whole are impacted by extraordinary events concerning one producer that are unrelated to subject imports. Specifically, DC Alabama incurred significant financial charges for environmental remediation in 2019 and 2020 and ceased production of silicon metal after Q1 2020 due to an extended safety stand down.[175] Even considering the industry without the data of DC Alabama, however, the remaining producers generally experienced the same trends of declining performance from 2018 to 2020. Notably, production, shipments, number of workers, hours worked, and net sales all declined between ***.[176] [177] As sales quantities and unit values fell, the industry moved from a positive operating margin in 2018 to losses at the gross, operating, and net levels in 2019 and 2020.[178] Thus, the negative impact of subject imports is not the result of the extraordinary events concerning DC Alabama.

From 2018 to 2020, significant volumes of cumulated subject imports that significantly undersold the domestic like product entered the U.S. market and took sales from the domestic industry. As a result, the domestic industry's production and shipments declined and the domestic industry's output and revenue were lower than they would have been otherwise. The significant price-depressing effects of subject imports resulted in lower prices for the domestic like product. Consequently, as prices continued to decline the domestic industry's COGS to net sales ratio rose[179] and the domestic industry's financial performance declined from 2018 to 2020, with the domestic industry sustaining operating and net losses in 2019 and 2020.[180] In light of these considerations, we find that subject imports had a significant impact on the domestic industry.

We have also considered whether there are other factors that may have had an impact on the domestic industry during the POI to ensure that we are not attributing injury from such other factors to cumulated subject imports. Nonsubject imports accounted for *** percent of

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[173] CR/PR at Table VI-1. The total COGS was $*** in 2018, $*** in 2019, and $*** in 2020. As a ratio to net sales, average COGS were *** percent in 2018, *** percent in 2019, and *** percent in 2020. *Id*.

[174] CR/PR at Table VI-1.

[175] CR/PR at Table III-3, Table VI-1 Note (environmental remediation charges in other factory costs of $*** and $*** in 2019 and 2020, respectively).

[176] Staff Table Alt. C-1.

[177] Chair Kearns finds it noteworthy that the declines in performance indicators were generally in excess of the *** percent decrease in apparent U.S. consumption from 2018 to 2020.

[178] Staff Table Alt. C-1.

[179] Excluding DC Alabama's data, the industry's COGS to net sales ratio rose from *** percent to *** percent over the POI. Staff Table Alt. C-1.

[180] CR/PR at Table VI-1.

apparent U.S. consumption in 2018, *** percent in 2019, and *** percent in 2020.[181] Although these shares are substantial and increased overall, it was cumulated *subject* imports' share of total U.S. shipments to aluminum end users that increased over the POI at the expense of the domestic industry, whereas nonsubject imports' share remained more constant.[182] As explained above, the sales in this segment of the market impact prices throughout the entire market. Thus, the presence of nonsubject imports in the U.S. market from 2018 to 2020 cannot explain the large declines in the domestic industry's prices over the POI.

Certain respondent parties argue that the domestic industry's poor performance was caused by a decline in the demand for silicon metal worldwide.[183] However, the decline in demand cannot account for the sales and market share lost by the domestic industry to low-priced subject imports. As noted above the domestic industry prices declined significantly for product 2, where subject imports were concentrated.[184] Additionally, although the CRU index showed that silicon metal in the United States consistently experienced a price premium relative to Europe and Japan, this premium began to erode in 2019 when the volume of low-priced subject imports began to increase and largely disappeared by the end of the period.[185] The significant underselling by subject imports, lost sales and market share, the rapidity and magnitude of price decreases, and the decline of a pricing premium in the U.S. market suggest that the decline in demand alone cannot account for the domestic industry's poor performance.

Certain respondent parties also argue that subject imports increasingly entered the U.S. silicon metal market because of the domestic industry's plant closures and decreased capacity.[186] Subject imports' market share rose by *** percentage points from 2018 to 2020 and domestic producers' market share declining by *** percentage points from 2018 to 2020.[187] However, plant closures do not explain the declining prices experienced by the domestic industry and caused by subject imports over the POI. We note that the domestic

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[181] CR/PR at Table C-1.

[182] CR/PR at Table D-1. Nonsubject imports' share of total U.S. shipments to aluminum end users was *** percent in 2018, *** percent in 2019, and *** percent in 2020; subject imports' share was *** percent in 2018, *** percent in 2019, and *** percent in 2020; and the domestic producers' share was *** percent in 2018, *** percent in 2019, and *** percent in 2020. *Id*.

[183] *See* PMB Prehearing Br. at 4; PCC Prehearing Br. at 30-31, 37.

[184] *See supra* at V.D.; CR/PR at Table C-1.

[185] Petitioners' Posthearing Br., Answers to Commissioner Questions, at 55.

[186] *See* WPNA Prehearing Br. at 6-7 and Exhibit 2; PCC Prehearing Br. at 70, 75 and PCC Posthearing Br. at Answer to Commissioner Question at 3. Petitioners rebut respondent's arguments as to supply constraints, asserting that PCC improperly assumes that all supply constraints reported by purchasers were constraints caused by the domestic industry, when *** were constraints of importers or distributors. Petitioners' Final Comments at 5.

[187] CR/PR at Table C-1. Globe ***, prior to the 2019 increase in subject imports. CR/PR at Table III-3.

industry reported available, unused capacity throughout the POI.[188] Accordingly, we find that the domestic industry's plant closures and decreased capacity cannot alone account for its poor performance.

We consequently conclude that other causes cannot explain the injury we have attributed to the cumulated subject imports. We accordingly determine that the domestic industry was materially injured by reason of cumulated subject imports.

VI. Critical Circumstances

A. Legal Standards and Party Arguments

In its final antidumping duty determination concerning silicon metal from Iceland, Commerce found that critical circumstances exist with respect to all subject producers/exporters.[189] Because we have determined that the domestic industry is materially injured by reason of subject imports from Iceland, we must further determine "whether the imports subject to the affirmative {Commerce critical circumstances} determination ... are likely to undermine seriously the remedial effect of the antidumping {and/or countervailing duty} order{s} to be issued."[190]

The SAA indicates that the Commission is to determine "whether, by massively increasing imports prior to the effective date of relief, the importers have seriously undermined the remedial effect of the order" and specifically "whether the surge in imports prior to the suspension of liquidation, rather than the failure to provide retroactive relief, is likely to seriously undermine the remedial effect of the order."[191] The legislative history for the critical circumstances provision indicates that the provision was designed "to deter exporters whose merchandise is subject to an investigation from circumventing the intent of the law by increasing their exports to the United States during the period between initiation of an investigation and a preliminary determination by {Commerce}."[192] An affirmative critical

[188] CR/PR at Table III-4. We note that in this industry, producers can at times achieve very high capacity utilization rates. For example, *** reported overall capacity utilization (including other products) of *** percent in 2018 and *** percent in 2019; *** reported or projected capacity utilization of *** percent to *** percent in 2019-2021; and subject producers as a whole projected capacity utilization of *** percent in 2021. CR/PR at Tables VII-3, VII-15, and VII-17.

[189] *Silicon Metal From Bosnia and Herzegovina and Iceland: Final Affirmative Determinations of Sales at Less than Fair Value and Final Affirmative Determination of Critical Circumstances for Iceland*, 86 Fed. Reg. 11720 (Feb. 26, 2021).

[190] 19 U.S.C. §§ 1671d(b)(4)(A)(ii), 1673d(b)(4)(A)(ii).

[191] SAA at 877.

[192] *ICC Industries, Inc. v United States,* 812 F.2d 694, 700 (Fed. Cir. 1987), *quoting* H.R. Rep. No. 96-317 at 63 (1979), *aff'g* 632 F. Supp. 36 (Ct. Int'l Trade 1986). *See* 19 U.S.C. §§ 1671b(e)(2), 1673b(e)(2).

circumstances determination by the Commission, in conjunction with an affirmative determination of material injury by reason of subject imports, would normally result in the retroactive imposition of duties for those imports subject to the affirmative Commerce critical circumstances determination for a period 90 days prior to the suspension of liquidation.

The statute provides that, in making this determination, the Commission shall consider, among other factors it considers relevant,

> (I) the timing and the volume of the imports,
>
> (II) a rapid increase in inventories of the imports, and
>
> (III) any other circumstances indicating that the remedial effect of the {order} will be seriously undermined.[193]

In considering the timing and volume of subject imports, the Commission's practice is to consider import quantities prior to the filing of the petition with those subsequent to the filing of the petition using monthly statistics on the record regarding those firms for which Commerce has made an affirmative critical circumstances determination.[194]

Petitioners argue that subject imports from Iceland surged immediately following the filing of the petition, increasing by 49.1 percent from January to June 2020 compared to July to December 2020.[195] Petitioners assert that the significant increase in subject imports from Iceland reflects an effort to avoid the effect of the petition by quickly inundating the U.S. market with low-priced imports once the case was filed.[196]

Certain respondent parties, PCC and MTALX, argue that the Commission should find that critical circumstances do not exist with respect to subject imports from Iceland.[197] PCC argues that the Commission should consider the full year period from 2019 to 2020 in its analysis of critical circumstances because *** reported that *** and that those *** months before the petition was filed.[198] As a result, PCC asserts that the shipments in the six-month period between July to December 2020 were to ***, prior to the filing of the petition.[199]

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[193] 19 U.S.C. §§ 1671d(b)(4)(A)(ii), 1673d(b)(4)(A)(ii).

[194] *See Lined Paper School Supplies from China, India, and Indonesia,* Inv. Nos. 701-TA-442-43, 731-TA-1095-97**,** USITC Pub. 3884 at 46-48 (Sept. 2006); *Carbazole Violet Pigment from China and India,* Inv*.* Nos. 701-TA-437 and 731-TA-1060-61 (Final), USITC Pub. 3744 at 26 (Dec. 2004); *Certain Frozen Fish Fillets from Vietnam,* Inv. No. 731-TA-1012 (Final), USITC Pub. 3617 at 20-22 (Aug. 2003).

[195] Petitioners' Posthearing Br. at 12.

[196] Petitioners' Prehearing Br. at 68.

[197] PCC Prehearing Br. at 164; MTALX Prehearing Br. at 3.

[198] PCC Prehearing Br. at 166.

[199] PCC Prehearing Br. at 166.

With regard to the volume of imports from Iceland, PCC argues that on a yearly basis it ***.[200] MTALX argues that, based on the six-month comparison period, an increase of *** was insignificant relative to apparent U.S. consumption in 2020, accounting for just *** percent.[201] PCC and MTALX assert that the end-of-period inventories declined, and urge the Commission to reach a negative critical circumstances determination with respect to Iceland.[202]

B. Analysis

We first consider the appropriate period for comparison of pre-petition and post-petition levels of subject imports from Iceland. In previous investigations, the Commission has relied on a shorter comparison period when Commerce's preliminary determination applicable to the country at issue fell within the six-month post-petition period the Commission typically considers.[203] That situation arises here with respect to silicon metal from Iceland, and we have thus determined to compare the volume of subject imports five months prior to the filing of the petition with the volume of subject imports five months after the filing of the petition in our critical circumstances analysis.[204]

Imports of silicon metal from Iceland subject to Commerce's affirmative critical circumstances finding increased from *** short tons to *** short tons between the two five-month comparison periods (February to June 2020 and July to November 2020).[205] U.S. importers' end-of-period inventories of subject imports from Iceland were lower at *** short tons in December 2020 than in December 2019 at *** short tons.[206]

We recognize that subject imports from Iceland increased during the five-month post-petition period compared to the pre-petition period. We find that the increase in subject imports from Iceland post-petition is not of a degree, in either absolute or relative terms, that would undermine seriously the remedial effect of the antidumping duty order, given the small

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[200] PCC Prehearing Br. at 166.

[201] MTALX Prehearing Br. at 3.

[202] PCC Prehearing Br. at 167; MTALX Prehearing Br. at 4.

[203] *Certain Hot-Rolled Steel Flat Products from Australia, Brazil, Japan, Korea, the Netherlands, Turkey, and the United Kingdom*, Inv. Nos. 701-TA-545-547, 731-TA-1291-1297 (Final), USITC Pub. 4638 at 49-50 (Sept. 2016); *Certain Corrosion-Resistance Steel Products from China, India, Italy, Korea, and Taiwan*, Inv. No. 701-TA-534-537 and 731-TA-1274-1278 (Final), USITC Pub. 4630 at 35-40 (July 2016); *Carbon and Certain Steel Wire Rod from China*, Inv. Nos. 701-TA-512, 731-TA-1248 (Final), USITC Pub. 4509 at 25-26 (Jan. 2015) (using five-month periods because preliminary Commerce countervailing duty determination was during the sixth month after the petition).

[204] The preliminary antidumping duty determination with respect to Iceland was made on December 7, 2020, within the six-month post-petition period of July through December 2020. The five-month periods would be February through June 2020 and July through November 2020.

[205] CR/PR at Table IV-4.

[206] CR/PR at Table C-1.

size of the increase relative to imports from Iceland in 2019 or 2020 as well as apparent U.S. consumption, and in light of the lower inventories. We also note that over 50 percent of the post-petition period imports were in the first month after the filing of the petition;[207] PCC claims that these first-month imports were to ***, prior to the filing of the petition. PCC's claim is consistent with importers reported lead times averaging *** days for shipments from overseas inventories.[208] We find that there are no indications of any other circumstances demonstrating that the remedial effect of the order will be or has been seriously undermined by the post-petition imports from Iceland.

We thus find that the imports from Iceland subject to Commerce's critical circumstances determination are not likely to undermine seriously the remedial effect of the antidumping duty order, and we make a negative critical circumstances finding with regard to those imports.

VII. Conclusion

For the reasons stated above, we determine that an industry in the United States is materially injured by reason of subject imports of silicon metal from Bosnia and Herzegovina and Iceland that are sold in the United States at less than fair value and subject imports from Kazakhstan that are subsidized by the government of Kazakhstan. We also find that critical circumstances do not exist with respect to subject imports from Iceland subject to Commerce's affirmative critical circumstances determination.

[207] CR/PR at Table IV-4.
[208] CR/PR at II-17.

Part I: Introduction

Background

These investigations result from petitions filed with the U.S. Department of Commerce ("Commerce") and the U.S. International Trade Commission ("USITC" or "Commission") by Globe Specialty Metals, Inc., Beverly, Ohio, and Mississippi Silicon LLC, Burnsville, Mississippi, on June 30, 2020, alleging that an industry in the United States is materially injured and threatened with material injury by reason of subsidized imports of silicon metal by the Government of Kazakhstan and less-than-fair-value ("LTFV") imports of silicon metal[1] from Bosnia and Herzegovina, Iceland, and Malaysia. The following tabulation provides information relating to the background of these investigations.[2] [3]

[1] See the section entitled "The subject merchandise" in Part I of this report for a complete description of the merchandise subject in this proceeding.

[2] Pertinent *Federal Register* notices are referenced in appendix A, and may be found at the Commission's website (www.usitc.gov).

[3] A list of witnesses that appeared at the hearing is presented in appendix B of this report.

Effective date	Action
June 30, 2020	Petitions filed with Commerce and the Commission; institution of Commission investigations (85 FR 41063, July 8, 2020)
July 20, 2020	Commerce's notice of initiation (85 FR 45173-45177, July 27, 2020)
August 14, 2020	Commission's preliminary determinations (85 FR 51491, August 20, 2020)
September 8, 2020	Commerce's postponement of preliminary determination-Kazakhstan-CVD (85 FR 55412, November 20, 2020)
November 27, 2020	Commerce's preliminary determination Kazakhstan-CVD and alignment of final determination with final antidumping duty determination (85 FR 78122, December 3, 2020)
December 7, 2020	Scheduling of final phase of Commission investigation (85 FR 86578, December 30, 2020)
December 7, 2020	Commerce's preliminary determinations LTFV and preliminary affirmative critical circumstances determinations (Iceland)—Bosnia and Herzegovina and Iceland (85 FR 80009, December 11, 2020)
January 26, 2021	Commerce's preliminary determination of LTFV--Malaysia, postponement of final determination, and extension of provisional measures (86 FR 7701, February 1, 2021)
February 22, 2021	Commission's hearing
February 22, 2021	Commerce's final determination Kazakhstan—CVD (86 FR 11725, February 26, 2021)
February 22, 2021	Commerce's final determinations LTFV and final affirmative critical circumstances (Iceland)—Bosnia and Herzegovina and Iceland (86 FR 11720, February 26, 2021)
March 24, 2021	Commission's vote
April 12, 2021	Commission's views

Statutory criteria

Section 771(7)(B) of the Tariff Act of 1930 (the "Act") (19 U.S.C. § 1677(7)(B)) provides that in making its determinations of injury to an industry in the United States, the Commission--

> *shall consider (I) the volume of imports of the subject merchandise, (II) the effect of imports of that merchandise on prices in the United States for domestic like products, and (III) the impact of imports of such merchandise on domestic producers of domestic like products, but only in*

the context of production operations within the United States; and. . . may consider such other economic factors as are relevant to the determination regarding whether there is material injury by reason of imports.

Section 771(7)(C) of the Act (19 U.S.C. § 1677(7)(C)) further provides that--[4]

In evaluating the volume of imports of merchandise, the Commission shall consider whether the volume of imports of the merchandise, or any increase in that volume, either in absolute terms or relative to production or consumption in the United States is significant.. . .In evaluating the effect of imports of such merchandise on prices, the Commission shall consider whether. . .(I) there has been significant price underselling by the imported merchandise as compared with the price of domestic like products of the United States, and (II) the effect of imports of such merchandise otherwise depresses prices to a significant degree or prevents price increases, which otherwise would have occurred, to a significant degree.. . . In examining the impact required to be considered under subparagraph (B)(i)(III), the Commission shall evaluate (within the context of the business cycle and conditions of competition that are distinctive to the affected industry) all relevant economic factors which have a bearing on the state of the industry in the United States, including, but not limited to. . . (I) actual and potential decline in output, sales, market share, gross profits, operating profits, net profits, ability to service debt, productivity, return on investments, return on assets, and utilization of capacity, (II) factors affecting domestic prices, (III) actual and potential negative effects on cash flow, inventories, employment, wages, growth, ability to raise capital, and investment, (IV) actual and potential negative effects on the existing development and production efforts of the domestic industry, including efforts to develop a derivative or more advanced version of the domestic like product, and (V) in {an antidumping investigation}, the magnitude of the margin of dumping.

In addition, Section 771(7)(J) of the Act (19 U.S.C. § 1677(7)(J)) provides that—[5]

(J) EFFECT OF PROFITABILITY.—The Commission may not determine that there is no material injury or threat of material injury to an industry in the United States merely because that industry is profitable or because the performance of that industry has recently improved.

[4] Amended by PL 114-27 (as signed, June 29, 2015), Trade Preferences Extension Act of 2015.
[5] Amended by PL 114-27 (as signed, June 29, 2015), Trade Preferences Extension Act of 2015.

Organization of report

Part I of this report presents information on the subject merchandise, alleged subsidy/dumping margins, and domestic like product. Part II of this report presents information on conditions of competition and other relevant economic factors. Part III presents information on the condition of the U.S. industry, including data on capacity, production, shipments, inventories, and employment. Parts IV and V present the volume of subject imports and pricing of domestic and imported products, respectively. Part VI presents information on the financial experience of U.S. producers. Part VII presents the statutory requirements and information obtained for use in the Commission's consideration of the question of threat of material injury as well as information regarding nonsubject countries.

Market summary

Silicon metal is composed almost exclusively of elemental silicon with a small amount of impurities such as iron, calcium, and aluminum. It is generally used as an alloying agent in aluminum production and by the chemical industry as an input in the production of silicones and polysilicon. Silicon metal is also used in a variety of applications, which include aluminum (auto/commercial), chemicals (silicones), and polysilicon (solar and electronics). The three U.S. producers of silicon metal are Globe Metallurgical Inc. ("Globe")[6], Dow Corning Alabama ("DC Alabama")[7], and Mississippi Silicon LLC ("MS Silicon"), while leading subject country producers of silicon metal outside the United States include R-S Silicon D.O.O. Mrkonjic Grad ("RS Silicon") of Bosnia and Herzegovina, PCC BakkiSilicon hf ("PCC") of Iceland, Tau-Ken Temir LLP ("Tau-Ken") of Kazakhstan, and PMB Silicon Sdn Bhd ("PMB") of Malaysia. The leading U.S. importer of silicon metal from Bosnia and Herzegovina is ***,[8] while the leading importer of silicon metal from Iceland is ***, and the leading importer of silicon metal from both Kazakhstan and Malaysia is ***. Leading importers of product from nonsubject countries (primarily Brazil, Canada, and Norway) include ***. U.S. purchasers of silicon metal are firms that include primary and secondary aluminum producers and silicon-based chemical producers. Leading purchasers include ***.

[6] Globe Metallurgical Inc. is 100 percent wholly owned by Globe Specialty Metals, Inc. and Ferroglobe PLC is the direct parent company of Globe Specialty Metals, Inc. Petition, p. 2.

[7] Dow Corning Corporation became a wholly-owned subsidiary of Dow Chemical in 2016. Dow Chemical and DuPont subsequently merged to form DowDuPont on September 1, 2017. Dow Corning Corporation changed its name to the Dow Silicones Corporation, effective February 1, 2018. Dow Corning Alabama is a subsidiary of the Dow Silicones Corporation.

[8] ***.

Apparent U.S. consumption of silicon metal totaled approximately *** short tons of contained silicon (***) in 2020. Currently, three firms are known to produce silicon metal in the United States. U.S. producers' U.S. shipments of silicon metal totaled *** short tons (***) in 2020 and accounted for *** percent of apparent U.S. consumption by quantity and *** percent by value. U.S. imports from subject sources totaled 25,523 short tons ($40.5 million) in 2020 and accounted for *** percent of apparent U.S. consumption by quantity and *** percent by value. U.S. imports from nonsubject sources totaled 111,609 short tons ($230.0 million) in 2020 and accounted for *** percent of apparent U.S. consumption by quantity and *** percent by value.

Summary data and data sources

A summary of data collected in these investigations is presented in appendix C, table C-1. Except as noted, U.S. industry data are based on questionnaire responses of three firms that accounted for all U.S. production of silicon metal during 2020. U.S. imports are based on official import statistics[9] [10] and on questionnaire responses from 16 U.S. importers that are believed to account for *** of subject imports from Bosnia and Herzegovina, *** of subject imports from Iceland, *** percent of subject imports from Kazakhstan, *** of subject imports from Malaysia, and *** of imports of silicon metal from combined subject sources in 2020. During 2020, imports of silicon metal from nonsubject sources accounted for *** of imports from nonsubject countries and *** of all imports of silicon metal from all sources. Foreign industry data are based on questionnaire responses of one firm in Bosnia and Herzegovina whose exports accounted for *** percent of U.S. imports of silicon metal from Bosnia and Herzegovina, one firm in Iceland whose exports accounted for *** percent of U.S. imports of silicon metal from Iceland, one firm in Kazakhstan whose exports accounted for *** percent of U.S. imports of silicon metal from Kazakhstan, and one firm in Malaysia whose exports accounted for *** percent of U.S. imports of silicon metal from Malaysia in 2020.

Previous and related investigations

Silicon metal has been the subject of several prior import injury proceedings in the United States. The following tabulation presents information regarding previous antidumping

[9] Current coverage numbers are based on General Imports for 2020.

[10] Official import statistics are based on General Imports using HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000, which measure the total physical arrivals of merchandise from foreign countries, whether such merchandise enters the U.S. customs territory immediately or is entered into bonded warehouses or free trade zones ("FTZs") under Customs custody.

and countervailing duty investigations. Table I-1 presents the previous and related silicon metal investigations.

Table I-1
Silicon metal: Previous and related investigations

Year petition filed	Inv. number	Country	USITC publication	Current status
1990	731-TA-470	Argentina[1]	3385	Commerce revoked effective 1/1/2000 (66 FR 10669, 2/16/2001)
1990	731-TA-471	Brazil[1]	3892	Commerce revoked effective 2/16/06 (71 FR 76635, 12/21/2006)
1990	731-TA-472	China	3892	Continuation of order effective 5/25/2018 (83 FR 25644, 6/4/2018)
2002	731-TA-991	Russia	3584	Continuation of order effective 6/24/2020 (85 FR 37831, 6/24/2020)
2004	701-TA-441	Brazil	N/A	Petitions withdrawn on 4/16/2004 (69 FR 23213, 4/28/2004)
2004	731-TA-1081	South Africa	N/A	Petitions withdrawn on 4/16/2004 (69 FR 23213, 4/28/2004)
2017	731-TA-1343 and 701-TA-567	Australia[2]	4773	Negative ITC determinations
2017	731-TA-1344 and 701-TA-568	Brazil[2]	4773	Negative ITC determinations
2017	701-TA-569	Kazakhstan[2]	4773	Negative ITC determinations
2017	731-TA-1345	Norway[2]	4773	Negative ITC determinations

[1] Petitions were filed concurrently with the petition related to silicon metal from China (731-TA-472, order continued in 2018).

[2] Commerce made its final determinations on March 8, 2018, and the Commission made its final negative determinations on April 10, 2018.

Source: *Silicon Metal from Australia, Brazil, Kazakhstan, and Norway,* Inv. Nos. 701-TA-567-569 and 731-TA-1343-1345 (Final), USITC Publication 4773, April 2018; *Silicon Metal From Russia, Investigation No. 731-TA-991 (Third Review)*, USITC Publication 5058, May 2020; and cited FR notices.

Nature and extent of subsidies and sales at LTFV

Subsidies

On February 26, 2021, Commerce published a notice in the *Federal Register* of its final determination of countervailable subsidies for producers and exporters of product from

Kazakhstan.[11] Table I-2 presents Commerce's final findings of subsidization of silicon metal from Kazakhstan.

Table I-2
Silicon metal: Commerce's final subsidy determination with respect to imports from Kazakhstan

Entity	Final countervailable subsidy margin (percent)
Tau-Ken Temir LLP and JSC NMC Tau-Ken Samruk	160.00
All others	160.00

Source: 86 FR 11725, February 26, 2021.

Sales at LTFV

On February 26, 2021, Commerce published a notice in the *Federal Register* of its final determinations of sales at LTFV with respect to imports from Bosnia and Herzegovina and Iceland.[12] On February 1, 2021, Commerce published a notice in the *Federal Register* of its preliminary determination of sales at LTFV, and postponement of its final determination, with respect to imports from Malaysia.[13]

Table I-3
Silicon metal: Commerce's final weighted-average LTFV margins with respect to imports from Bosnia and Herzegovina

Exporter/producer	Final dumping margin (percent)
R-S Silicon D.O.O	21.41
All others	21.41

Source: 86 FR 11720, February 26, 2021.

[11] 86 FR 11725, February 26, 2021.
[12] 86 FR 11720, February 26, 2021.
[13] 86 FR 7701, February 1, 2021.

Table I-4
Silicon metal: Commerce's final weighted-average LTFV margins with respect to imports from Iceland

Exporter/producer	Final dumping margin (percent)
PCC Bakki Silicon hf	47.54
All others	37.83

Source: 86 FR 11720, February 26, 2021.

Table I-5
Silicon metal: Commerce's preliminary weighted-average LTFV margins with respect to imports from Malaysia

Exporter/producer	Preliminary dumping margin (percent)
PMB Silicon Sdn. Bhd	7.21
All others	7.21

Source: 86 FR 7701, February 1, 2021.

The subject merchandise

Commerce's scope

In the current proceeding, Commerce has defined the scope as follows:[14]

> *The scope of these investigations covers all forms and sizes of silicon metal, including silicon metal powder. Silicon metal contains at least 85.00 percent but less than 99.99 percent silicon, and less than 4.00 percent iron, by actual weight. Semiconductor grade silicon (merchandise containing at least 99.99 percent silicon by actual weight and classifiable under Harmonized Tariff Schedule of the United States (HTSUS) subheading 2804.61.0000) is excluded from the scope of these investigations.*
>
> *Silicon metal is currently classifiable under subheadings 2804.69.1000 and 2804.69.5000 of the HTSUS. While the HTSUS numbers are provided for convenience and customs purposes, the written description of the scope remains dispositive.*

Tariff treatment

Based upon the scope set forth by Commerce, information available to the Commission indicates that the merchandise subject to these investigations is imported under the following

[14] 86 FR 7701, February 1, 2021.

provisions of the Harmonized Tariff Schedule of the United States ("HTS") - 2804.69.10 (covering shipments of silicon containing, by weight, less than 99.99 percent silicon but not less than 99 percent silicon) and 2804.69.50 (for other silicon containing, by weight, less than 99 percent silicon). High-content silicon (containing, by weight, not less than 99.99 percent silicon) is imported under HTS subheading 2804.61.00 and is not included in these investigations. The 2020 general rate of duty is 5.3 percent *ad valorem* for HTS subheading 2804.69.10, and 5.5 percent *ad valorem* for HTS subheading 2804.69.50.[15] Silicon metal that is the product of Kazakhstan or Bosnia and Herzegovina and is classified in HTS subheading 2804.69.10 is eligible for duty-free entry under the Generalized System of Preferences, but not under HTS subheading 2804.69.50.[16] Decisions on the tariff classification and treatment of imported goods are within the authority of U.S. Customs and Border Protection.

Section 301 tariff treatment

Based on the scope set forth by Commerce, none of the merchandise described by the scope is currently subject to additional duties under section 301 of the Trade Act of 1974, as amended.[17] However, out-of-scope semiconductor grade silicon metal (containing at least 99.99 percent silicon by actual weight) originating in China and entering under HTS statistical reporting number 2804.61.0000 are subject to additional 25 percent section 301 ad valorem

[15] HTSUS (2021) Revision 2, USITC Publication 5156, January 2021, p. 28-4.

[16] USITC, "General Notes, Products of Countries Designated Beneficiary Developing Countries for Purposes of the Generalized System of Preferences (GSP)," *HTSUS (2020) Revision 14*, GN p. 11. See HTS general note 4.

[17] Section 301 of the *Trade Act of 1974*, as amended (19 U.S.C. § 2411) authorizes the Office of the United States Trade Representative ("USTR"), at the direction of the President, to take appropriate action to respond to a foreign country's unfair trade practices. On August 18, 2017, USTR initiated an investigation into certain acts, policies, and practices of the Government of China related to technology transfer, intellectual property, and innovation (82 FR 40213, August 24, 2017). On April 6, 2018, USTR published its determination that the acts, policies, and practices of China under investigation are unreasonable or discriminatory and burden or restrict U.S. commerce, and are thus actionable under section 301(b) of the *Trade Act* (83 FR 14906, April 6, 2018).

duties, effective May 10, 2019.[18] See also U.S. notes 20(e) and 20(f), subchapter III of chapter 99.[19] [20]

The product

Description and applications

Silicon is a light chemical element with metallic and nonmetallic characteristics. It is a semiconductor, meaning it does not conduct electricity at room temperature, but does so when it is heated. Silicon is rarely found free in nature; it combines with oxygen and other elements to form silicates, which comprise more than 25 percent of the Earth's crust. Silica in the form of quartz[21] or quartzite is used to produce silicon ferroalloys for the iron and steel industries, while silicon metal (also produced from quartz) is primarily used by the aluminum and chemical industries.[22] Silicon metal is a product normally composed almost entirely of elemental silicon, along with small amounts of other elements, such as iron, aluminum, and calcium.[23] It is manufactured and sold in various

[18] HTS subheading 2804.61.0000 was included in the USTR's third enumeration ("Tranche 3") of products originating in China that became subject to an additional 10 percent ad valorem Section 301 duties (Annexes A and C of 83 FR 47974), on or after September 24, 2018. Tranche 3 covered 6,031 tariff subheadings, with an approximate annual trade value of $200 billion (83 FR 47974, September 21, 2018). Escalation of this duty to 25 percent ad valorem was rescheduled from January 1, 2019 (annex B of 83 FR 14906, April 6, 2018) to March 2, 2019 (83 FR 65198, December 19, 2018), but was subsequently postponed until further notice (84 FR 7966, March 5, 2019), and then was implemented as of May 10, 2019 (84 FR 20459, May 9, 2019).

[19] HTSUS (2021) Revision 2, USITC Publication 5156, January 2021, pp. 99-III-23 to 99-III-24, 99-III-42, 99-III-213.

[20] Certain silica and quartz sands (the primary raw material inputs for silicon metal) originating in China and entering under HTS statistical reporting numbers HTS 2505.10.1000 and 2505.10.5000 are subject to additional 25 percent duties under Section 301 of the Trade Act of 1974. U.S. imports of these products from China were minimal from 2017 – June 2020 and it is not known if any if the imports were used for silicon metal production or for other applications. Based on record for this and other recent silicon metal investigations, domestic producers use domestically sourced sands and do not import any of these sands from China for the production of silicon metal.

[21] Quartz is a chemical compound consisting of one part silicon and two parts oxygen, also known as silicon dioxide (SiO_2).

[22] USGS, *2017 Minerals Yearbook, Silicon Chapter*, p. 67.1, https://prd-wret.s3-us-west-2.amazonaws.com/assets/palladium/production/atoms/files/myb1-2017-simet.pdf, retrieved July 8, 2020.

[23] Silicon metal that is subject these investigations can be used as a starting material for the manufacture of ultra-high-purity semiconductor or solar grades whose silicon content is 99.99 percent or greater. Semiconductor and solar grade silicon metal is not included within the scope of these investigations.

degrees of purity. Whether domestic or imported, it is usually sold in lump form, typically ranging from 6 inches x ½ inch to 4 inches x ¼ inch, or in powder form.[24] According to Roskill Information Service LLC ("Roskill"), global silicon metal consumption increased by 6.5 percent per year between 2010 and 2019.[25]

Silicon metal is principally used as an alloying agent in aluminum production by the aluminum industry, as an input in the production of silicones, and to produce polycrystalline silicon ("polysilicon"). As an alloying agent, silicon metal is used in the production of both primary aluminum (produced from ore) and secondary aluminum (produced from scrap). Silicon is a necessary ingredient in aluminum casting alloys, where it improves fluidity, castability, strength, and weldability when added to aluminum.[26] Aluminum producers add silicon in lump form to aluminum during the smelting process. Primary aluminum typically contains between 8-12 percent silicon and is used in applications where appearance is important, such as wheels for automobiles. Secondary aluminum typically contains less silicon than primary aluminum and is used for internal automobile parts and applications where appearance is not significant. Other applications for silicon metal include the production of brass and bronzes, die casting, steel, copper alloys, ceramic powders, and refractory coatings.

Chemical manufacturers consume silicon metal in powder form to produce silicones and polysilicon. The chemical manufacturers that have their own grinding facilities purchase silicon metal in lump form and grind it into powder themselves. Firms that do not have grinding facilities purchase silicon metal as a powder.[27] A lower grade of powder called fines, a byproduct of the crushing and sizing process, is sold for ceramic and refractory applications. In the chemical industry, silicon metal is used as the basis for the production of silanes, which are used to produce a family of organic compounds known as silicones. Silicones are used for a variety of applications, including adhesives, resins, lubricants, plastomers, anti-foaming agents, and water-repellent compounds.[28]

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[24] These dimensions refer to the maximum and minimum sizes of the silicon metal lumps.

[25] *Silicon & Ferrosilicon: Outlook to 2029,* Roskill Information Services, Ltd., May 5, 2020. https://roskill.com/market-report/silicon-ferrosilicon/.

[26] Many aluminum alloys are used by the transportation sector as a substitute for heavier metals to reduce weight and improve the efficiency of vehicles and aircraft.

[27] Size consistency is important to chemical producers that purchase silicon metal in powder form. Suppliers to such customers must qualify their product before bidding to supply the chemical manufacturer. For that reason, there is no difference in terms of size consistency between qualified imports and domestic products.

[28] The silicones production process involves reacting silicon metal with methyl chloride in the presence of a copper catalyst to produce a mixture of methylchlorosilanes. Certain of these silanes are then hydrolyzed to produce the basic methylsilicone building block for the various silicone products.

Silicon metal that is included in these investigations is also consumed as the base material for making polysilicon, a high-purity form of silicon manufactured by chemical producers that is primarily used in semiconductors and solar cells.[29] Polysilicon producers purchase in-scope silicon metal and then further refine it into higher-purity polysilicon that is not in the scope of these investigations. Polysilicon producers typically have very stringent quality standards for silicon and sometimes require low-boron silicon metal. According to Roskill, silicon consumption for use in solar applications more than tripled between 2010 and 2019.[30]

According to Globe, although silicon metal is often described in terms of different grades, there is no uniformly accepted grade classification system. Silicon metal "grades" refer to ranges of specifications that are typically sold to particular types of customers.[31] These specifications establish the minimum amounts of silicon and the maximum amounts of other elements, such as boron, iron, calcium, and aluminum that the silicon metal may contain. The ranges of specifications vary depending on the type of end use of the silicon metal, and the differences between these ranges of specifications can be relatively small but important.[32] There are four broadly defined categories, or grades, of silicon metal, which are generally ranked in descending order of purity as: (1) semiconductor grade;[33] (2) chemical grade; (3)

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[29] Polysilicon, which is not within the scope of these investigations, generally contains over 99.999 percent silicon and is made by reacting high purity metallurgical silicon with hydrogen chloride gas in the presence of catalysts, producing silicon tetrachloride, which is then purified by fractional distillation. The purified distillate is pyrotically decomposed to produce hyperpure metal and hydrochloric acid.

[30] *Silicon & Ferrosilicon: Outlook to 2029,* Roskill Information Services, Ltd., May 5, 2020. https://roskill.com/market-report/silicon-ferrosilicon/.

[31] Some suppliers, customers, and publications refer to numerical grade designations such as "Grade 553." "Grade 553" is silicon metal with a maximum iron content of 0.5 percent, a maximum aluminum content of 0.5 percent, and a maximum calcium content of 0.3 percent. Such silicon metal normally has a minimum silicon content of 98.5 percent.

[32] According to the petitioners, in some cases, higher grade silicon metal is shipped to a purchaser with a lower specification requirement. However, according to respondent PCC, this does not happen because it does not make commercial sense for silicon metal producers to sell a high cost, high grade silicon metal at a loss. Higher quality grades are more expensive to produce, require more production effort and therefore, having reached the requisite quality, down-selling it would not make any sense. Furthermore, a customer operating in, for example, the secondary aluminum market may need specifications that are different from those present in chemical grade silicon metal. Petitioners' Witness Testimony, Exhibit 3, p. 18.; Respondents' (Icelandic producers) postconference brief, attachment B, p. 9.; WPNA also states that this type of sale likely never happens, for the same reasons indicated by PCC.; Respondents' (WPNA) postconference brief, p. 9.

[33] Semiconductor grade silicon, used in the electronics industry, is not covered by the scope of these investigations. It is a high-purity product generally containing over 99.99 percent silicon.

metallurgical grade used to produce primary aluminum; and (4) metallurgical grade used to produce secondary aluminum. Petitioner Globe lists its silicon metal product specifications as:[34]

- High purity grade: silicon 98.50 percent min., iron 0.10 percent max., calcium 0.07 percent max., aluminum 0.20 percent max.
- Chemical grade: silicon 98.50 percent min., iron 0.50 percent max., calcium 0.07 percent max., aluminum 0.20 percent max.
- Primary aluminum grade: silicon 98.50 percent min., iron 0.35 percent max., calcium 0.07 percent max.
- Secondary aluminum grade: silicon 98.50 percent min., iron 1.00 percent max., calcium 0.40 percent max.

Silicon specifications can be customer-specific and some customers, such as certain polysilicon producers, require higher grades of silicon than the ones listed by Globe. Some chemical and polysilicon producers require their suppliers to go through a qualification process and undergo subsequent monitoring of their manufacturing facilities to ensure that their products are consistent in size and grade and that there are no changes to manufacturing location, process conditions, or raw materials.[35] According to the petitioners, silicon metal produced to the same specification is wholly interchangeable for its intended application. Moreover, if silicon metal produced for one end user possesses specifications that fall within the parameters of the specifications of a different end-user, whether in their end-use segment or another, then the silicon metal could be used interchangeably.[36] Respondent PCC indicates that clear distinctions exist between chemical and primary and secondary aluminum grades, based on the chemical composition, which affects quality. According to PCC, chemical grade silicon metal is higher quality and commands a higher price than the aluminum grades, and due to chemical composition requirements, different grades would not be interchangeable.[37]

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[34] Petition, Vol. 1, p. 7.; The petitioners stated that the type and level of impurities and the silicon content are the principal factors that determine if the silicon metal product can be used in a given application. As such, it is not possible to assume that silicon metal imported under HTS subheading 2804.69.10 (silicon containing by weight less than 99.99 percent but not less than 99.00 percent silicon) is necessarily better quality than silicon metal imported under HTS subheading 2804.69.50 (silicon containing by weight less than 99.00 percent silicon), even though the silicon content of the former is higher.

[35] The secondary aluminum segment does not typically require suppliers to go through a qualification process and instead accepts a certification and chemical analysis report instead, making this segment easier to access, especially for new market entrants.; *Answers to Staff Questions,* Petitioners' postconference brief, p. 2.

[36] *Answers to Staff Questions,* Petitioners' postconference brief, pp. 1-2.

[37] Respondents' (Icelandic producers) postconference brief, p. 2.

Respondent WPNA also argues that different grades of silicon metal are not interchangeable or fungible.[38] ***[39]

Manufacturing processes[40]

In general, all silicon metal, regardless of specification, is produced using essentially the same process and inputs (figure I-1).[41] Silica in the form of high purity quartz is combined in a "charge" with a carbonaceous reductant such as low-ash coal, charcoal, or petroleum coke, and a bulking agent, usually wood chips. The charge is placed in a submerged arc electric furnace. Electrical energy is delivered from a transformer system to the furnace. High-current, low-voltage electricity is delivered to the reaction by electrodes — conductors made from pre-baked or self-baking amorphous carbon.

The charge is heated to approximately 3,000 degrees Fahrenheit. At this temperature, the oxygen in the SiO2 separates from the silicon and combines with the carbon in the reductant to form carbon monoxide gas. The simplified chemical reaction is: SiO2 + 2C → Si + 2CO. The gas escapes, leaving molten silicon. The silicon is removed or "tapped" from the furnace on either a continuous or an intermittent basis. In the molten state, the silicon metal is often refined by oxygen injection to remove impurities such as aluminum and calcium. Some impurities cannot be removed from the liquid silicon and, therefore, must be controlled by raw material selection.[42] After tapping (or refining), the silicon metal is poured into large flat iron molds or onto beds of silicon metal fines. The resulting ingot or billet is subsequently crushed to the desired size specification. It can be further ground into powder for some customers in the chemicals industry. The silicon is typically delivered to end users in 2,000- to 3,000-pound super

[38] Respondents' (Wacker) postconference brief, p. 3

[39] Respondents' (Icelandic producers) postconference brief, attachment B, p. 2.

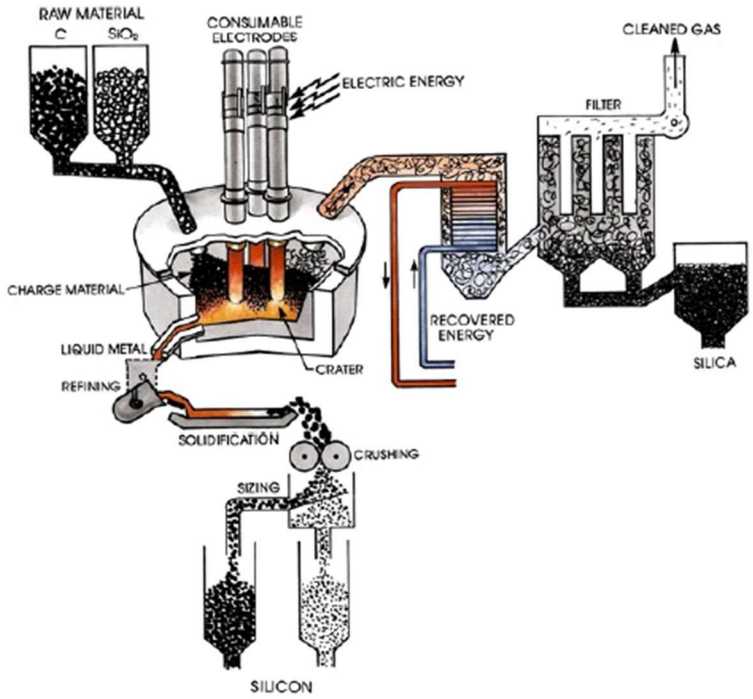
[40] Unless otherwise indicated, information in this section was taken from the Petition, Vol. 1, pp. 9-10, and *Silicon Metal from Australia, Brazil, Kazakhstan, and Norway.* Inv. No. 701-567-569 and 731-TA-1343-1345 (Final) USITC Publication 4773, April 2018, pp. I-15–I-18

[41] Petitioners claim they are not aware of any production differences between silicon metal produced in the United States and silicon metal produced in respondent countries. Moreover, petitioners claim there should be no differences in the composition of silicon metal produced by U.S. producers and silicon metal imported from subject countries. *Answers to Staff Questions,* Petitioners' postconference brief, p. 4.

[42] The most important factor in raw material selection is the iron content of the quartz or gravel being used, because the silicon production process does not allow iron content to be changed. Other impurities can be and are controlled through different types of refining; *Answers to Staff Questions,* Petitioner's postconference brief, p. 3; Respondent PCC notes that raw materials can differ in chemical composition from country to country; Respondents' (Icelandic producers) postconference brief, attachment B, p. 5.

sacks, wooden boxes, or customer specific packaging. Some customers elect to send their own trucks to the plant to take the silicon in bulk form.

Figure I-1



Source: Xakalashe, B.S. and M. Tangsted, "Silicon Processing: From Quartz to Crystalline Silicon Solar Cells" *Southern African Prometallurgy 2011,* Southern African Institute of Mining and Metallurgy, Johannesburg, March 2011, p. 88.

By-products in the production process of silicon metal are silica fume, silicon dross, silicon fines, crusher dust, slag, and heavies.[43]

[43] Silica fume (microsilica) — small particles of unreduced silicon dioxide recovered from the off-gases of silicon metal furnaces — is a by-product of silicon metal production. Silica fume is used in making concrete, oil well grouts, cementitious repair products, refractories and ceramics, and other products. Silicon dross/slag is material raked out of ladles used in casting silicon metal. The Si content is generally 40-50%, with the balance mainly aluminum and/or calcium oxides. Dross is used to make silicon briquettes, which are further used in the steel and iron foundry industries. Silicon fines (sometimes called silicon particles) are generated during the crushing/sizing of silicon metal to the final size required by customers. A certain quantity of the metal being crushed winds up being too small to sell as silicon metal. These fines are also used to make silicon briquettes. Crusher dust is also generated during crushing/sizing of materials. Heavies are slightly larger particles that are swept up in the off-gas flow from the furnace. These are often small parts of wood, gravel dust, or coal ash. They are segregated out of the off-gas flow before it reaches the baghouse. Heavies are used to make filling agent for hot metal coatings in foundry applications or are mixed with lime to make ladle covers for the steel industry. *Answers to Staff Questions,* Petitioners' postconference brief, pp. 10-13.

Silicon metal plants are typically located at sites that have access to a competitively priced and reliable source of electricity, an ample supply of raw materials, and an adequate labor pool. In particular, given the large amounts of quartz required to produce silicon metal, plants are normally located near quartz sources. Silicon plants typically operate furnaces 24 hours per day, 7 days per week, to maximize efficiency, so they constantly consume raw materials. Forty-nine percent of the cost of silicon metal production is attributable to raw materials (coal, woodchips, quartz, and carbon electrodes), 21 percent to energy, 18 percent to labor, and 12 percent to other costs.[44]

Submerged arc furnaces used for silicon production are relatively similar worldwide, but there are some physical differences in furnace designs and the electrodes. Certain furnaces are more energy efficient. Reportedly, Globe requires about 13,000 to 14,000 kilowatt hours of electricity to produce one short ton of silicon metal, but some plants with newer furnaces, like Mississippi Silicon, are able to produce the same quantity of silicon metal using only 9,500 to 10,000 kilowatt hours of electricity.[45] Purities of the raw materials and the carbon sources used can vary widely.

Some producers of silicon metal also produce ferrosilicon.[46] Ferrosilicon is an alloy of iron and silicon with silicon content varying from 45 percent to 90 percent and the iron content making up most of the remaining specification. Ferrosilicon is used in the production of steel (especially stainless and heat-resisting steel) and cast iron. Silicon metal and ferrosilicon are produced using similar production processes and equipment, but the same furnaces cannot produce both products at the same time. It is generally easier (less time consuming) for firms to switch from silicon metal production to ferrosilicon production than the reverse. Ferrosilicon can be produced at lower temperatures than silicon because of the iron content, resulting in less power consumed to produce ferrosilicon than silicon. It is less costly to produce ferrosilicon than silicon metal.[47] Depending on the producer, there may be certain differences in the type of electrodes used, and there are differences in terms of raw material selection.[48] According to

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[44] *Silicon Metal from Australia, Brazil, Kazakhstan, and Norway.* Inv. No. 701-567-569 and 731-TA-1343-1345 (Final) USITC Publication 4773, April 2018, p. I-18.

[45] *Answers to Staff Questions,* Petitioners' postconference brief, pp. 4-5.

[46] This includes magnesium ferrosilicon, which is an alloy of iron, silicon, magnesium, calcium, and rare earths. The silicon content varies from 42 percent to 48 percent, the magnesium content varies from 3 percent to 9 percent, the calcium content varies from 0.25 to 3.25 percent, and rare earths vary from 0.1 percent to 3.5 percent. For most specifications, it is cheaper to produce magnesium ferrosilicon than silicon metal; however, depending on the cost of raw material inputs for highly alloyed specifications, costs could be on par with silicon metal.

[47] *Answers to Staff Questions,* Petitioners' postconference brief, p. 14.

[48] *Answers to Staff Questions,* Petitioners' postconference brief, p. 3.

WPNA, ferrosilicon production uses self-baked electrodes which are less costly than pre-baked or graphite electrodes. The quartz used to produce ferrosilicon doesn't have to meet the high standards on iron content that is required to produce silicon and can be sourced from a large number of gravel mines. Moreover, tapping of the finished product can be done into larger ladles that are often up to five times bigger than conventional ladles used to tap silicon metal. Ferrosilicon is usually not refined to adjust its quality, and as such, the ladles are not equipped with the fittings required for refining.[49] In the United States, Globe produces both silicon metal and ferrosilicon, but did not use the same furnaces for both. Mississippi Silicon does not produce ferrosilicon.

According to Globe, ***[50]

Domestic like product issues

No issues with respect to domestic like product have been raised in these investigations. The petitioners propose that the Commission define a single domestic like product that is co-extensive with the scope of the investigations consisting of all silicon metal, which they assert is consistent with the domestic like product definition adopted by the Commission in its recent investigations involving silicon metal from Russia. Respondents have not contested the domestic like product definition during the preliminary or final phase of these investigations.

[49] Respondents' (WPNA) postconference brief, p. 7.
[50] *Answers to Staff Questions,* Petitioners' postconference brief, p. 15.

Part II: Conditions of competition in the U.S. market

U.S. market characteristics

Silicon metal is a polycrystalline material typically sold in lump form. Chemical producers, primary aluminum producers, and secondary aluminum producers are the principal end users of silicon metal. Demand for silicon metal is derived from the demand for the silicon-based chemicals (silicones for use in the solar and electronics industries, and various other products) and aluminum alloys in which it is used as an input.[1] These different end uses have different minimum requirements for the types and amounts of impurities in silicon metal.

Apparent U.S. consumption of silicon metal decreased by *** percent from 2018 to 2020.

[1] *Silicon Metal from Australia, Brazil, Kazakhstan, and Norway*, 83 FR 16382, April 16, 2018.

U.S. purchasers

The Commission received 24 usable questionnaire responses from firms that had purchased silicon metal during 2018-20.[2] [3] Most responding purchasers (14) are secondary aluminum end users, 3 are primary aluminum end users, 4 are chemical end users including silicones and/or polysilicon ***,[4] and 4 reported that they are "other." All these "other" purchasers purchase for metallurgical applications (***).[5]

The largest purchasers of silicon metal in 2020 were chemical end users: ***.[6] The responses of the 20 metallurgical end users and the 4 chemical end users are reported separately in this section and in part V when applicable.[7]

[2] The following firms provided purchaser questionnaire responses: ***.

[3] Of the 24 responding purchasers, 21 purchased domestic silicon metal, 9 purchased imports of silicon metal from Bosnia and Herzegovina, 10 purchased imports of silicon metal from Iceland, 8 purchased imports of silicon metal from Kazakhstan, 9 purchased imports of silicon metal from Malaysia, 21 purchased imports of or imported silicon metal from nonsubject sources, and 10 purchased from unknown sources. Firms reporting purchasing from unknown sources included two that purchased from sources that can be determined by further investigation ***. The remaining 8 purchasers purchased *** short tons from firms that sold both subject and nonsubject imports from firms for which the source is unknown.

[4] ***.

[5] None of the purchasers reported it was a distributor.

[6] The other chemical end user was ***.

[7] Metallurgical end users include ***.

Channels of distribution

U.S. producers and imports from nonsubject sources were sold mainly to chemical end users, as shown in table II-1. Imports from Iceland, Kazakhstan, and Malaysia sold mainly to secondary aluminum end users. Imports from Bosnia and Herzegovina sold mainly to distributors.

The purchaser questionnaire responses also show that silicon metal imported from subject countries tends not to be sold to chemical end users. Purchaser responses indicate that firms in the chemical industry typically purchase silicon metal from U.S. or nonsubject country[8] sources rather than silicon metal from subject sources. The four chemical end users (***) reported purchasing and importing *** short tons of silicon metal in 2020 (*** percent of all purchases and imports reported by these purchasers in 2020). All four chemical end users purchased U.S. produced silicon metal.[9] Chemical end users do not use silicon metal from subject countries in chemical production ***.[10] Three purchasers (***) purchased or imported silicon metal ***.

[8] Chemical end users reported purchases from nonsubject sources including ***.
[9] ***.
[10] ***

The silicon metal sold to distributors tends to be the type of silicon metal sold to metallurgical users and is unlikely to be sold to chemical end users. Producers and importers that sold silicon metal to distributors were asked if the product that they sold to distributors was "the type of silicon metal sold to the secondary market" and if they "expect that distributors sell wholly to secondary aluminum purchasers." Three importers and two producers reported selling some product to distributors.[11] The three responding importers *** reported that the product they sell to distributors is the type of silicon metal sold to the secondary aluminum market. All three responding importers *** reported selling to distributors that they expected that distributors sell mainly to secondary aluminum purchasers, but two importers and one producer reported that distributors may also sell to other users.[12] None of the importers mentioned chemical end users as potential customers for distributors ***. Respondent PCC stated that "chemical grade customers buy directly from the producers due to the quality requirements and generally do not use distributors so all sales of the distributors would be to the secondary aluminum users."[13]

Petitioners stated that "chemical companies have a much more detailed specification" than metallurgical users and that "there is no grade that is good for a whole segment of the market."[14] They also responded that they try to sell to all parts of the market.[15]

[11] The three importers (***) that reported sales to distributors. U.S. producers ***. ***.
[12] ***.
[13] PCC's posthearing brief, responses to Commission questions, p. 34.
[14] Hearing transcript, pp. 47-48 (Lage).
[15] Hearing transcript, pp. 60-61 (Bowes, Lage).

Table II-1
Silicon metal: U.S. producers' and importers' U.S. commercial shipments, by sources and channels of distribution, 2018-20

Item	Period		
	2018	2019	2020
	Share of reported shipments (percent)		
U.S. producers' U.S. commercial shipments of silicon metal:			
Distributors	***	***	***
Chemical/polysilicon producers	***	***	***
Primary aluminum producers	***	***	***
Secondary aluminum producers	***	***	***
Other end users	***	***	***
U.S. importers' U.S. commercial shipments of silicon metal from Bosnia and Herzegovina:			
Distributors	***	***	***
Chemical/polysilicon producers	***	***	***
Primary aluminum producers	***	***	***
Secondary aluminum producers	***	***	***
Other end users	***	***	***
U.S. importers' U.S. commercial shipments of silicon metal from Iceland:			
Distributors	***	***	***
Chemical/polysilicon producers	***	***	***
Primary aluminum producers	***	***	***
Secondary aluminum producers	***	***	***
Other end users	***	***	***
U.S. importers' U.S. commercial shipments of silicon metal from Kazakhstan:			
Distributors	***	***	***
Chemical/polysilicon producers	***	***	***
Primary aluminum producers	***	***	***
Secondary aluminum producers	***	***	***
Other end users	***	***	***
U.S. importers' U.S. commercial shipments of silicon metal from Malaysia:			
Distributors	***	***	***
Chemical/polysilicon producers	***	***	***
Primary aluminum producers	***	***	***
Secondary aluminum producers	***	***	***
Other end users	***	***	***
U.S. importers' U.S. commercial shipments of silicon metal from all subject sources combined:			
Distributors	***	***	***
Chemical/polysilicon producers	***	***	***
Primary aluminum producers	***	***	***
Secondary aluminum producers	***	***	***
Other end users	***	***	***

Table continued on next page.

Table II-1—Continued
Silicon metal: U.S. producers' and importers' U.S. commercial shipments, by sources and channels of distribution, 2018-20

Item	Period		
	2018	2019	2020
	Share of reported shipments (percent)		
U.S. importers' U.S. commercial shipments of silicon metal from nonsubject sources:			
Distributors	***	***	***
Chemical/polysilicon producers	***	***	***
Primary aluminum producers	***	***	***
Secondary aluminum producers	***	***	***
Other end users	***	***	***
U.S. importers: All import sources:			
Distributors	***	***	***
Chemical/polysilicon producers	***	***	***
Primary aluminum producers	***	***	***
Secondary aluminum producers	***	***	***
Other end users	***	***	***
All reported sales:			
Distributors	***	***	***
Chemical/polysilicon producers	***	***	***
Primary aluminum producers	***	***	***
Secondary aluminum producers	***	***	***
Other end users	***	***	***

Source: Compiled from data submitted in response to Commission questionnaires.

Geographic distribution

U.S. producers reported selling silicon metal to *** (table II-2). Importers reported selling to all regions of the continental United States except the Mountain region. For U.S. producers, *** percent of sales were within 100 miles of their production facility, *** percent were between 101 and 1,000 miles, and *** percent were over 1,000 miles. Importers sold 21.7 percent within 100 miles of their U.S. point of shipment, 64.5 percent between 101 and 1,000 miles, and 13.8 percent over 1,000 miles.

Table II-2
Silicon metal: Geographic market areas in the United States served by U.S. producers and importers

Region	U.S. producers	Bosnia and Herzegovina	Iceland	Kazakhstan	Malaysia
Northeast	2	---	1	1	2
Midwest	3	---	2	3	3
Southeast	3	---	2	2	1
Central Southwest	2	---	1	1	1
Mountain	2	---	---	---	---
Pacific Coast	2	---	1	1	1
Other	---	---	---	---	---
All regions (except Other)	1	---	---	---	---
Reporting firms	3	---	2	3	3

Note: All other U.S. markets, including AK, HI, PR, and VI.
Note: ***.

Source: Compiled from data submitted in response to Commission questionnaires.

Supply and demand considerations

U.S. supply

Table II-3 provides a summary of the supply factors regarding silicon metal from U.S. producers and from subject countries. Subject importers report much less capacity than the United States. Iceland and Malaysia are relatively new producers of silicon metal. The producer in Iceland (PCC) started production in 2018 and the producer in Malaysia (PMB) started production in 2019. ***. Tau Ken-has been shutdown since last year.

Table II-3
Silicon metal: Supply factors that affect the ability to increase shipments to the U.S. market

Country	Capacity (1,000 short tons contained silicon)		Capacity utilization (percent)		Ratio of inventories to total shipments (percent)		Shipments by market, 2020 (percent)		Able to shift to alternate products
	2018	2020	2018	2020	2018	2020	Home market shipments	Exports to non-U.S. markets	No. of firms reporting "yes"
United States	***	***	***	***	***	***	***	***	2 of 3
Bosnia and Herzegovina	***	***	***	***	***	***	***	***	0 of 1
Iceland	***	***	***	***	***	***	***	***	0 of 1
Kazakhstan	***	***	***	***	***	***	***	***	0 of 1
Malaysia	***	***	***	***	***	***	***	***	0 of 1

Note: Responding U.S. producers accounted for all U.S. production of silicon metal in 2020. Responding foreign producer/exporter firms accounted for all U.S. imports of silicon metal from Bosnia and Herzegovina, Iceland, Kazakhstan, and Malaysia during 2020. Tau-Ken, the producer in Kazakhstan, reported that it had stopping production on January 1, 2020 and it predicted no production in 2021 and 2022 because of "Covid-19 and reduced global demand for silicon metal". Tau-Ken reported it may resume production depending on market conditions and investors. For additional data on the number of responding firms and their share of U.S. production and of U.S. imports from each subject country, please refer to Part I, "Summary Data and Data Sources."

Source: Compiled from data submitted in response to Commission questionnaires.

Domestic production

Based on available information, U.S. producers of silicon metal have the ability to respond to changes in demand with moderate changes in the quantity of shipments of U.S.-produced silicon metal to the U.S. market. The main contributing factors to this degree of responsiveness of supply are the availability of some unused capacity and the ability to shift production to or from alternate products. Factors mitigating responsiveness of supply include limited inventories and limited ability to shift shipments from alternate markets.

Both U.S. capacity and U.S. production declined between 2018 and 2020; however production declined more than capacity, resulting in reduced capacity utilization. Exports are limited; export markets include Canada, Germany, and the United Kingdom. Another product that producers reportedly can produce on the same equipment as silicon metal is ferrosilicon.[16] Factors affecting U.S. producers' ability to shift production include developing a new customer base, downtime requirements, investment in capital, and purchasing different raw materials. Despite reporting high capacity utilization in 2020 of *** percent, ***."

Subject imports from Bosnia and Herzegovina

Based on available information, RS silicon has the ability to respond to changes in demand with large changes in the quantity of shipments of silicon metal to the U.S. market. The main contributing factors to this degree of responsiveness of supply are the availability of unused capacity, large inventories, and the ability to shift shipments from alternate markets. Factors mitigating responsiveness of supply is no ability to shift production to or from alternate products.

Capacity utilization decreased as both production and capacity decreased. RS silicon cannot produce other products on its equipment ***. Its main export market is *** and no barriers are reported to prevent shifting between markets.

Subject imports from Iceland

Based on available information, PCC has the ability to respond to changes in demand with moderate changes in the quantity of shipments of silicon metal to the U.S. market. The main contributing factors to this degree of responsiveness of supply are the availability of unused capacity, and the ability to shift shipments from alternate markets. Factors mitigating the responsiveness of supply include the lack of inventories and its limited ability to shift production to or from alternate products.

PCC's production and capacity *** from 2018, when it began production, to 2019, but both capacity and production *** between 2019 and 2020 (when production was shut down in July 2020). Capacity was *** short tons in 2018, *** short tons in 2019, and *** short tons in 2020, but was projected to ***.

[16] ***.

Production was *** short tons in 2018, and *** short tons in 2019 and *** short tons in 2020.[17] Thus the reported capacity in 2020 does not reflect PCC capacity for a full year. PCC reported it was not feasible to produce other products on the same equipment as it used to produce silicon metal. Factors reducing PCC's ability to produce at full capacity include severe winter conditions and the newness of the plant, which creates operational issues. Its main export market is the EU and no barriers are reported to prevent shifting between markets.

Subject imports from Kazakhstan

Based on available information, Tau-Ken has the ability to respond to changes in demand with small changes in the quantity of shipments of silicon metal to the U.S. market. The main contributing factor is that it ***. A factor mitigating responsiveness of supply is ***.

***.

Subject imports from Malaysia

Based on available information, PMB has the ability to respond to changes in demand with moderate changes in the quantity of shipments of silicon metal to the U.S. market. The main contributing factors to this degree of responsiveness of supply are the ability to shift production to or from alternate markets and some inventories. Factors mitigating responsiveness of supply include limited availability of unused capacity, and the lack of ability to shift production to or from alternate products.

[17] ***.

PMB Silicon began production of silicon metal in Malaysia in 2019. ***.[18] The Malaysian producer reported that it was not feasible to produce other products on the same equipment as it uses to produce silicon metal. Other export markets included ***. It reports that the price of silicon metal increased due to a shortage of silicon metal in the aluminum, computer, electronics, and chemical industries. ***.

Imports from nonsubject sources

Nonsubject imports accounted for 81.5 percent of total U.S. imports in 2020. The largest sources of nonsubject imports during 2018-20 were Brazil, Canada, and Norway. Combined, these countries accounted for 72.2 percent of nonsubject imports in 2020.[19] Respondents state that in 2020 Rima Brazil added "the biggest furnace of silicon metal" increasing silicon metal supply.[20]

Supply constraints

No U.S. producer reported supply constraints. Three of 13 responding importers, 8 of 20 metallurgical end users, and 2 of 4 chemical end users reported supply constraints. Purchasers reported constraints for both U.S. producers and importers. U.S. producer constraints reported by purchasers included: an inability of MS Silicon to meet grade and quality needs because of production constraints; a sold-out domestic supplier; the inability of Globe to provide the full amount of silicon metal requested in 2020 and 2021; and the inability of Globe and MS Silicon to meet increased supply requirements out of their U.S. production in December 2020 and in 2021, however, ***. Constraints of imported material were reported to be largely the result of antidumping cases: importer *** declined to supply material in 2021 because of the present investigations; an antidumping petition restricted supplies from Australia; a one-time inability in 2019 of CCMA to sell on the spot market; and one purchaser was not able to get any quotes from distributors because of

[18] PMB Silicon predicts that same capacity and production in 2022 as it predicts for 2021.
[19] Based on HTS 2804.69.1000 and 2804.69.5000, accessed January 4, 2021.
[20] Hearing transcript, pp. 205-206 (Foglia).

lack of supply. Importers reported that the plants in Iceland and Kazakhstan were closed for part of the period, and importers were unable to sell because of the investigation.

Chemical end users reported supply constraints from U.S. producers including ***. ***.

New suppliers

Seven of 24 purchasers (5 of 20 metallurgical end users and 2 of 4 chemical end users) indicated that new suppliers have entered the U.S. market since January 1, 2018. Purchasers cited Liasa (Brazil) which is reported to now sell direct to the U.S. market, Hanwa (Japan), Iceland, Malaysia, and HiTest Sands (a Canadian firm). One purchaser, ***, reported that HiTest Sands was attempting to open a facility in Newport, Washington but this "project is no longer moving forward and is not expected to begin producing any products in the next few years."[21] [22]

U.S. demand

Based on available information, the overall demand for silicon metal is likely to experience small changes in response to changes in price. Silicon metal accounts for a small share of the total cost of its aluminum (***) end-use products and a small to moderate share of its chemical (silica/silicon) end-use products, and demand responsiveness is constrained by the limited of substitute products in metallurgical end uses and lack of substitute products for chemical end uses.

[21] Petitioners post conference brief, answers to staff, questions p. 6.

[22] Chemical end users reported new facilities in Iceland, Malaysia, and expanded capacity in Brazil.

End uses and cost share

U.S. demand for silicon metal depends on the demand for U.S.-produced downstream products. Silicon metal is primarily used by chemical end users that produce polysilicon and silicone products, and by aluminum producers as an alloying agent. These types of end users typically required different grades of silicon metal, with purer grades or grades with more detailed specifications sold to chemical end users and metallurgical grades sold to the aluminum end users. Available information indicates that silicon metal accounts for a small-to-moderate share of the cost of the end-use products in which it is used. Cost shares were estimated by ***, importers, and purchasers.

The most frequently reported end uses were various types of aluminum including alloys, billet used in a direct extrusion process, casting, die-casting, foundry alloys, high silicon alloys, ingots, primary aluminum, and secondary aluminum. The cost shares in these aluminum end uses were mainly less than 10 percent, with 14 responses[23] reporting that the cost share was less than 5 percent, 8 responses of cost shares ranged from 5 to 9 percent, 5 responses of cost shares ranged from 10 to 14 percent, and 5 responses of cost shares of 15 to 19 percent.[24] A cost share was also reported for one other metallurgical end use: ***.

Cost shares reported for chemical end uses tended to be higher than those reported for aluminum. Whereas one response reported a cost share of less than 10 percent (*** percent for ***), four responses of cost shares between 15 and 20 percent, and two responses of cost shares that were above 20 percent. These firms reported cost shares of *** percent for ***, and *** percent for ***.

[23] Purchasers were asked to provide cost shares for up to three end uses. These are counted by end use. Individual firms may have reported similar cost shares for multiple end uses.

[24] In addition, one firm reported a cost share of *** percent for secondary aluminum.

Business cycles

All 3 responding U.S. producers, 6 of 14 importers, 9 of 20 purchasers for metallurgical end uses, and 3 of 4 purchasers for chemical end uses indicated that the market was subject to business cycles or conditions of competition. Specifically, demand is heavily dependent on the aluminum industry and on many consumer products; that demand in the aluminum sector reflects auto production; and that demand in the chemical market was reported to mainly reflect solar and electronic demand growth. A number of firms reported that a change in the conditions of competition in the silicon metal industry resulted from Globe's merger with FerroAtlantica which has increased concentration in silicon metal production.[25] In addition, one purchaser (***) reported that Globe has stopped production of silicon metal at some of its U.S. facilities in order to take advantage of the lower cost of production in other countries.[26]

Petitioners report that because of COVID-19, the auto industry shifted reduced auto production both to put in protective measures and, in some cases, to shift production temporarily to "critical needs like ventilators." This caused orders for aluminum to drop in April to July, but demand recovered later in 2020.[27] Petitioners report that demand in the chemical sector in 2020, was largely unchanged overall, with demand increasing for some products balancing decreased demand for other products.[28]

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[25] The Globe FerroAtlantica merger was finalized by the end of 2015. https://www.metalbulletin.com/Article/3517192/FerroAtlntica-Globe-merger-completed.html; retrieved March 15, 2021. One purchaser reported that Ferroglobe owns the majority of the silicon metal production capacity in the United States and the EU, all production capacity in South Africa, and half of the Canadian production capacity.

[26] In the Q3 2018 Earnings Call by Ferroglobe pp 14-15: "We were further propelled to curtail production in the U.S. because of some favorable trends relating to foreign exchange, particularly in South Africa, which is now our lowest cost production base." "Additionally, we curtailed 36,000 tons of silicon metal capacity in the U.S., 24,000 tons by idling two furnaces at Selma and the balance by idling one furnace at Beverly. "In the quest to continue to optimize our production portfolio, the mentioned silicon metal curtailments are being partially compensated with increases in the production of other products. For instance, the two furnaces at Château-Feuillet will be taking over production of calcium silicon and foundry products from our factory in Mendoza, Argentina, while Beverly has increased its ferrosilicon production."

[27] Hearing transcript, pp. 30-31 (Bowes).

[28] Hearing transcript, p. 31 (Bowes).

Demand trends

Most firms reported U.S. demand for silicon metal had either decreased (12 responses) or fluctuated (15 responses) since January 1, 2018 (table II-4).[29] Respondents explain that demand declined in the secondary aluminum market because of the "increased availability of silicon-rich aluminum scrap which reduced required silicon additions by local secondary aluminum smelters" and trade conflicts with China that reduced demand for silicon metal from U.S. solar polysilicon producers.[30] Purchasers were asked how overall demand changed since 2018. Metallurgical end users' responses were varied: a plurality reported that demand had not changed (7 of 18), but multiple purchasers reported that demand had fluctuated (5); and more metallurgical end users reported demand had decreased (4) than reported that demand had increased (2). Half the responding (2 of 4) chemical end users reported that overall demand had fluctuated and one each reported demand has decreased and was unchanged. When asked about demand for their end use products a plurality of metallurgical purchasers (7 of 20) reported demand had fluctuated, 6 reported demand was unchanged, 5 reported demand decreased, and 2 reported demand increased. In contrast, half the chemical purchasers (2 of 4) reported that demand for their end uses had increased and half (2) reported demand had fluctuated.

Table II-4
Silicon metal: Firms' responses regarding U.S. demand and demand outside the United States

Item	Increase	No change	Decrease	Fluctuate
Demand in the United States:				
U.S. producers	---	---	2	2
Importers	1	1	5	5
Purchasers: Metallurgical end uses	2	7	4	5
Purchasers: Chemical end uses	---	1	1	2
Demand outside the United States:				
U.S. producers	1	---	1	1
Importers	3	1	3	5
Purchasers: Metallurgical end uses	2	5	3	1
Purchasers: Chemical end uses	1	---	---	1
Demand for end use products:				
Purchasers: Metallurgical end uses	2	6	5	7
Purchasers: Chemical end uses	2	---	---	2

Source: Compiled from data submitted in response to Commission questionnaires.

[29] ***.

[30] Hearing transcript, pp. 123-124 (Heffner).

Substitute products

Substitutes for silicon metal are limited and few firms reported substitutes. One of 3 responding producers, 1 of 12 responding importers, 3 of 20 responding metallurgical end users, and 1 of 4 chemical end user reported a substitute for silicon metal (but this was for metallurgical end uses not chemical end uses). These firms reported that aluminum scrap was a substitute for silicon metal in the production of aluminum. One explained that as Chinese demand for aluminum scrap (which contains silicon) decreases, the price of aluminum scrap to secondary aluminum producers decreases. As a result, it noted, secondary aluminum producers are able to use more aluminum scrap containing silicon and therefore demand less silicon metal. No substitutes were reported for chemical end uses.[31]

Substitutability issues

The degree of substitution between domestic and imported silicon metal depends upon such factors as quality (e.g., purity/and types of impurities, consistency, grade standards, etc.), relative prices (discounts/rebates), and conditions of sale (e.g., lead times between order and delivery dates, reliability of supply, product services, etc.). Based on available data, staff believes that for metallurgical end uses, there is high degree of substitutability between domestically produced silicon metal and silicon metal imported from Bosnia and Herzegovina, Iceland, Kazakhstan, and Malaysia. However the degree of substitution for chemical end users between subject imports and U.S.-produced silicon metal is low. Substitutability thus is limited to the extent that the silicon metal imported from subject countries is typically not sold to the chemical end users' sector of the market. Different sectors of the market typically require different chemistry of the silicon metal that they purchase. Sources that report selling high purity grades of silicon metal (U.S. producers and nonsubject sources) are also the sources used for production by the chemical end users. Imports from subject countries were only reported to be metallurgical grade.

[31] Chemical end user (***) reported that aluminum scrap could be used in secondary aluminum production but it did not report any substitutes for chemical end uses.

Lead times

Domestically produced silicon metal is primarily produced-to-order while subject imports are generally sold from inventories. U.S. producers reported that *** percent of their commercial shipments were produced-to-order, with lead times averaging *** days. The remaining *** percent of their commercial shipments came from inventories, with lead times averaging *** days. Importers reported that *** of their commercial shipments were from U.S. inventories, with lead times averaging *** days, *** percent came from overseas inventories, with lead times averaging *** days, and *** percent was produced-to-order with lead times averaging *** days.[32]

Knowledge of country sources

Eighteen of 20 metallurgical end users indicated they had marketing/pricing knowledge of domestic silicon metal, 5 of silicon metal imported from Bosnia and Herzegovina, 6 of silicon metal imported from Iceland, 7 of silicon metal imported from Kazakhstan, 5 of silicon metal imported from Malaysia, and 8 of silicon metal imported from nonsubject countries.

All four responding chemical end users indicated they had marketing/pricing knowledge of domestic silicon metal and silicon metal from nonsubject countries. One chemical end user had marketing/pricing knowledge of silicon metal imported from Bosnia and Herzegovina, Kazakhstan, and Malaysia, while two chemical end users reported that they had marketing/pricing knowledge of silicon metal imported from Iceland.

[32] Importer *** reported that its produced-to-order silicon metal lead times' averaged *** days.

As shown in table II-5a, most metallurgical end users "sometimes" or "never" make purchasing decisions based on the producer or country of origin. In contrast, as shown in table II-5b, most chemical end users report that they "always" make their purchases based on the producer, but half "never" make purchase decisions based on country of origin. Both metallurgical and chemical purchasers' customers are overwhelmingly reported to "never" making purchasing decisions based on the producer or country of origin of the silicon metal. *** of the chemical end users explained why they purchased based on the manufacturer: ***.[33] One of the three aluminum end users reporting it "always" made decisions based on the manufacturer explained that it required all its producers to be prequalified.

Table II-5 a
Silicon metal: Purchasing decisions reported by metallurgical end users based on producer and country of origin

Purchaser/customer decision	Always	Usually	Sometimes	Never
Purchaser makes decision based on producer	3	3	6	8
Purchaser's customers make decision based on producer	---	---	---	15
Purchaser makes decision based on country	3	1	7	9
Purchaser's customers make decision based on country	---	---	1	14

Source: Compiled from data submitted in response to Commission questionnaires.

Table II-5 b
Silicon metal: Purchasing decisions reported by chemical end users based on producer and country of origin

Purchaser/customer decision	Always	Usually	Sometimes	Never
Purchaser makes decision based on producer	3	1	---	---
Purchaser's customers make decision based on producer	---	---	---	1
Purchaser makes decision based on country	---	1	1	2
Purchaser's customers make decision based on country	---	---	---	1

Source: Compiled from data submitted in response to Commission questionnaires.

[33] The other chemical end user ***

Factors affecting purchasing decisions

The most often cited top three factors that both metallurgical and chemical end users consider in their purchasing decisions for silicon metal were quality/chemistry (21 firms (17 metallurgical and 4 chemical end users)) availability/delivery/reliability of supply (20 firms (16 metallurgical and 4 chemical end users)) and price (18 firms (15 metallurgical and 3 chemical end users)), as shown in table II-6. Quality/chemistry was the most frequently cited first-most important factor (cited by 12 firms (10 metallurgical and 2 chemical end users)), followed by availability (6 firms (4 metallurgical and 2 chemical end users)); quality was the most frequently reported second-most important factors (8 firms (6 metallurgical and 2 chemical end users)); and price was the most frequently reported third-most important factors (8 firms (5 metallurgical and 3 chemical end users)). All four chemical end users reported either quality/chemistry or availability/reliability of supply as either their most important factor or their second most important factor and three reported price as the third most important factor.[34]

Table II-6
Silicon metal: Ranking of factors used in purchasing decisions as reported by U.S. purchasers, by factor

	Purchasers: Metallurgical end uses				Purchasers: Chemical end uses			
Factor	First	Second	Third	Total	First	Second	Third	Total
Quality/chemistry	10	6	1	17	2	2	0	4
Availability/delivery/reliability of supply	4	5	7	16	2	2	0	4
Price	3	7	5	15	0	0	3	3
Terms/credit limit	1	2	2	5	0	0	0	0
Diversity of supply	1	0	1	2	0	0	0	0
Service	0	1	1	2	0	0	0	0
Consistent/traditional supplier	0	0	2	2	0	0	1	1
Other	2	0	2	4	0	0	0	0

Note: Other factors include (country of) origin, and *** for first factor; and inventories, and willingness to sell in the marketplace for third factor. A number of firms reported more than one factor in their responses, these multiple responses are included in the table above.
Note: One purchaser (***) reported both chemistry/product specification for its first factor and quality meets industry standards for its second factor both responses have been included in quality.

Source: Compiled from data submitted in response to Commission questionnaires.

[34] ***.

Half the metallurgical end users (10 of 20) reported that they “usually” purchase the lowest-priced product. Seven “sometimes” purchase the lowest-priced product, two “never” purchase the lowest priced product, and one “always” purchased the lowest priced product. Half (2 of 4) of the responding chemical end users (***) reported that they “never” purchased the lowest priced product and half reported they “usually” purchase the lowest priced product.

Importance of specified purchase factors

Purchasers were asked to rate the importance of 23 factors in their purchasing decisions (table II-7a for metallurgical end users and table II-7b for chemical end users). The factors rated as very important by more than half of responding metallurgical end users were availability (20 of 20), reliability of supply (19), delivery time and quality meets industry standard (17 each), product consistency (16), price (14), delivery terms and maximum iron content (13 each), and maximum calcium content and payment terms (11 each). For four factors, more metallurgical purchasers reported that the factor was not important than reported that it was very important: availability in bulk (12 reported it was not important), product range (9), maximum boron content (8), and maximum aluminum content and minimum quantity requirements (6 each).

The factors rated as very important by more than half of four responding chemical end users were availability, maximum aluminum content, maximum boron content, maximum calcium content, product consistency, and reliability of supply (4 each), and availability in bulk, delivery time, maximum iron content, maximum phosphorous content, and technical support (3 each). There were four factors for which more chemical end users reported that the factor was not important than reported that it was very important including: availability in bags (4), discounts offered (3), product range (2), and payment terms (1).

Table II-7a
Silicon metal: Importance of purchase factors, as reported by U.S. purchasers that were metallurgical end users, by factor

	Purchasers: Metallurgical end users		
Factor	Very important	Somewhat important	Not important
Availability	20	0	0
Reliability of supply	19	1	0
Delivery time	17	3	0
Quality meets industry standards	17	3	0
Product consistency	16	3	0
Price	14	6	0
Delivery terms	13	7	0
Maximum iron content	13	6	0
Payment terms	11	8	1
Maximum calcium content	11	7	1
Available in bags	8	8	4
Available from multiple sources	8	7	5
Packaging	7	13	0
U.S. transportation costs	7	9	4
Quality exceeds industry standards	6	10	4
Discounts offered	6	10	3
Maximum phosphorous content	5	9	6
Technical support/service	6	8	6
Minimum quantity requirements	5	9	6
Maximum aluminum content	5	6	6
Maximum boron content	4	8	8
Product range	4	7	9
Available in bulk	0	8	12

Note: VI = very important, SI = somewhat important, NI = not important.

Source: Compiled from data submitted in response to Commission questionnaires.

Table II-7b
Silicon metal: Importance of purchase factors, as reported by U.S. purchasers that were chemical end users, by factor

	Purchasers: Chemical end users		
Factor	Very important	Somewhat important	Not important
Availability	4	0	0
Maximum aluminum content	4	0	0
Maximum boron content	4	0	0
Maximum calcium content	4	0	0
Product consistency	4	0	0
Reliability of supply	4	0	0
Maximum iron content	3	1	0
Maximum phosphorous content	3	1	0
Technical support/service	3	1	0
Delivery time	3	1	0
Available in bulk	3	0	1
Available from multiple sources	2	2	0
Packaging	2	2	0
Price	2	2	0
Quality exceeds industry standards	2	2	0
U.S. transportation costs	2	2	0
Delivery terms	2	1	1
Minimum quantity requirements	2	0	2
Quality meets industry standards	1	2	1
Product range	1	0	2
Payment terms	0	3	1
Discounts offered	0	1	3
Available in bags	0	0	4

Note: VI = very important, SI = somewhat important, NI = not important.

Source: Compiled from data submitted in response to Commission questionnaires.

Purchasers were asked what factors determined quality. Metallurgical end users listed a number of factors including: chemistry (minimum silicon content and maximum level of impurities (iron, calcium, oxides and phosphorous) dross/trace elements); meeting specifications; recovery rate; and sizing (limited fines and particle size distribution).

Chemical end users listed a large number of potential impurities that can affect the quality of silicon metal including: aluminum, boron, calcium, carbon, chromium, copper, iron, lead, manganese, magnesium, nickel, oxides, phosphorus, titanium, tin, and vanadium.[35]

Supplier certification

Most purchasers (15 of 20 responding metallurgical end users and all 4 responding chemical end users) require their suppliers to become certified or qualified to sell silicon metal to their firm. Certification requirements included: test for consistency specifications, sizing, fines, and impurities (lab analysis or certificate of analysis); test runs in furnaces; and ease of release for deliveries. Chemical end users average times to qualify a supplier that ranged from 120 days to 2 years, while metallurgical end users' average qualification times were typically shorter, ranging from 1 to 180 days.

Four purchasers (2 of 20 responding metallurgical end users and 2 of 4 responding chemical end users) reported that one or more firms had failed in their attempts to qualify silicon metal or had lost their approved status since 2018. One metallurgical end user reported that first NT Rudock (a distributor) had failed to qualify because of size and contamination, then became qualified, and afterwards was disqualified again. Another metallurgical end user reported that MS Silicon failed qualification because of poor quality, low metal recovery, and product chemistry but since that instance, it has become qualified for some of the purchaser's facilities. Chemical end user ***. Chemical end user ***.

[35] ***. ***. ***. ***.

Minimum requirements and offers of higher purity

Purchasers were asked to report their requirements for silicon metal used in their applications. Firms reported numerous different requirements, and some purchasers also reported requirements that differed either by the product they produced or by the plant in which the silicon metal was used. The most common reported requirement was adherence to the "553" standard, that is 0.5 percent aluminum, 0.5 iron, and 0.3 percent calcium (identified by 7 of the 20 responding metallurgical end users). The four chemical end users reported individual requirements rather than standard requirements.

Firms were asked if they had been offered higher purity silicon metal than required for, or normally used in, their applications. Twenty-two of 24 responding purchasers reported that they never received offers of silicon metal with purities higher than they required.[36]

Changes in purchasing patterns

Purchasers were asked about changes in their purchasing patterns from different sources since 2018 (table II-8). Specifically, firms reduced purchases from the United States because of price, terms, credit, availability, curtailed production of downstream product, and COVID-19. Firms increased purchases from U.S. producers because of increased production/resumption of purchases, price, proximity, service, packaging, delivery, and special requirements.[37] Only metallurgical purchasers reported purchasing silicon metal from subject countries. Firms added or increased purchases from Bosnia and Herzegovina because of price and it being a new source. Firms reduced purchases of product from Bosnia and Herzegovina because of price, terms, these investigations, and because its supplier changed sources. Firms added or increased purchases from Iceland because of price, availability, and because its supplier chose to supply it with silicon metal from Iceland. Firms reduced purchases of product from Iceland because of price. No purchaser reported increasing purchases of silicon metal from Kazakhstan. Purchasers reduced purchases of product from Kazakhstan because of price, availability, its supplier changed source, and the 2018 silicon metal antidumping investigation. Purchasers increased purchases from Malaysia because it was a new supplier, because their

[36] Both firms reporting that they "sometimes" received offers of higher purity silicon metal were metallurgical end users. One of these (***) reported offers of 99.9 percent silicon but did not know the source of this material. The other (***) reported it required 0.5 iron but was offered silicon metal with 0.35 to 0.15 iron content from Brazil, Australia, and the United States.

[37] One firm reported its purchases of U.S. product fluctuated because of Globe's decisions to provide either from its U.S. or its Canadian plant. Others reported purchases of U.S. silicon metal fluctuated because of availability, price, delivery, and payment terms.

supplier changed its source, and because of price. One purchaser reported it decreased its purchases of Malaysian silicon metal because it only purchased trial material in order to qualify an additional source.

Table II-8
Silicon metal: Changes in purchase patterns from U.S., subject, and nonsubject countries

Source of purchases	Did not purchase	Decreased	Increased	Constant	Fluctuated
	Purchasers: Metallurgical end users				
United States	3	8	2	3	5
Bosnia and Herzegovina	10	5	2	---	3
Iceland	8	2	5	---	2
Kazakhstan	8	8	---	---	2
Malaysia	6	1	3	3	3
Nonsubject sources	2	7	6	4	2
Unknown sources	5	5	0	1	2
	Purchasers: Chemical end users				
United States	---	1	1	---	2
Bosnia and Herzegovina	4	---	---	---	---
Iceland	4	---	---	---	---
Kazakhstan	4	---	---	---	---
Malaysia	4	---	---	---	---
Nonsubject sources	1	---	2	---	1
Unknown sources	2	---	---	---	1

Source: Compiled from data submitted in response to Commission questionnaires.

Most purchasers (14 of 20 metallurgical and 3 of 4 responding chemical end users) reported that they had changed suppliers since January 1, 2018. Reasons for changing suppliers included: delivery; demand decreased reducing the number of suppliers needed; normal supplier changes due to the competitive bidding process; packaging; price; quality (suppliers were either added or dropped because of quality); service; suppliers inability to provide additional product needed; supply problems of U.S. suppliers; and terms.[38]

[38] One purchaser reported that a new source was needed to maintain multiple sources when FerroAtlantica and Globe merged, however, this merger occurred in 2015.

Importance of purchasing domestic product

Almost all purchasers (23 of 24) reported that all of their purchases did not require purchasing U.S.-produced product. No purchasers reported that domestic product was required by law or was required by their customers, and one, a secondary aluminum producer, reported it preferred domestic product. Reasons this purchaser cited for preferring domestic product were risk management, diversification, and price.

Comparisons of domestic products, subject imports, and nonsubject imports

Purchasers were asked a number of questions comparing silicon metal produced in the United States, subject countries, and nonsubject countries. First, purchasers were asked for a country-by-country comparison on the same 23 factors for which they were asked to rate the importance in table II-7 (table II-9). Only metallurgical end users compared U.S.-produced silicon metal to that produced in subject countries whereas all four responding chemical end users only compared U.S. produced silicon metal to silicon metal produced in nonsubject countries. Most metallurgical end users reported that product from the United States and from each of the subject countries and from nonsubject countries were comparable for all factors. Most chemical end users reported that product produced in the United States and nonsubject countries were comparable for most factors. Three of four chemical end users reported nonsubject imported silicon metal was superior for aluminum content and two of four rated U.S.-produced silicon metal superior for delivery time and U.S. transportation costs.

Table II-9
Silicon metal: Purchasers' comparisons between U.S.-produced and imported product

Factor	U.S. vs. Bosnia and Herzegovina (metallurgical end users)			U.S. vs. Iceland (metallurgical end users)			U.S. vs. Kazakhstan (metallurgical end users)		
	S	C	I	S	C	I	S	C	I
Availability	1	9	---	1	9	---	1	8	---
Available from multiple sources	---	9	---	1	7	---	1	7	---
Available in bags	---	10	---	---	10	---	---	9	---
Available in bulk	3	5	---	2	5	---	4	5	---
Delivery terms	---	10	---	1	9	---	---	9	---
Delivery time	1	9	---	1	9	---	1	8	---
Discounts offered	---	8	2	---	6	3	---	6	3
Maximum aluminum content	---	10	---	---	10	---	---	9	---
Maximum boron content	---	9	---	---	10	---	---	7	---
Maximum calcium content	---	10	---	---	10	---	---	9	---
Maximum iron content	---	10	---	---	10	---	---	9	---
Maximum phosphorous content	---	10	---	---	9	---	---	8	---
Minimum quantity requirements	---	8	1	1	8	---	1	8	---
Packaging	---	9	1	---	10	---	---	9	---
Payment terms	1	7	2	1	8	1	---	8	1
Price	---	8	2	---	7	3	---	5	3
Product consistency	---	10	1	---	10	---	---	9	---
Product range	---	10	---	---	9	---	---	9	---
Quality meets industry standards	---	10	---	---	10	---	---	9	---
Quality exceeds industry standards	---	7	1	---	8	---	---	8	---
Reliability of supply	1	8	---	1	8	---	1	7	---
Technical support/service	1	7	---	1	6	---	1	7	---
U.S. transportation costs	---	8	---	---	7	---	---	6	---

Table continued on next page.

Table II-9--Continued
Silicon metal: Purchasers' comparisons between U.S.-produced and imported product

Factor	U.S. vs. Malaysia (metallurgical end users)			U.S. vs. nonsubject (metallurgical end users)			U.S. vs. nonsubject (chemical end users)		
	S	C	I	S	C	I	S	C	I
Availability	1	8	---	1	14	1	---	4	---
Available from multiple sources	---	8	---	---	12	2	---	4	---
Available in bags	---	9	---	---	16	---	---	2	---
Available in bulk	3	5	---	3	11	---	---	3	---
Delivery terms	---	9	---	1	15	---	---	4	---
Delivery time	1	8	---	2	14	---	2	2	---
Discounts offered	---	7	2	---	12	3	---	4	---
Maximum aluminum content	---	9	---	---	15	---	---	1	3
Maximum boron content	---	8	---	---	13	---	---	3	1
Maximum calcium content	---	9	---	1	14	---	---	4	---
Maximum iron content	---	9	---	---	15	---	---	4	---
Maximum phosphorous content	---	8	---	---	14	---	---	4	---
Minimum quantity requirements	---	9	---	1	13	1	---	3	1
Packaging	---	9	---	---	16	---	---	4	---
Payment terms	---	8	1	---	14	2	---	4	---
Price	---	6	3	---	13	2	---	4	---
Product consistency	---	9	---	---	16	---	---	4	---
Product range	---	9	---	---	14	---	---	2	1
Quality meets industry standards	---	9	---	---	16	---	---	3	---
Quality exceeds industry standards	---	9	---	---	14	---	---	3	1
Reliability of supply	1	8	---	2	13	1	---	3	1
Technical support/service	1	7	---	2	12	---	---	4	---
U.S. transportation costs	---	5	---	---	14	---	2	2	---

Note: A rating of superior means that price/U.S. transportation cost is generally lower. For example, if a firm reported "U.S. superior," it meant that the U.S. product was generally priced lower than the imported product.
Note: S=first listed country's product is superior; C=both countries' products are comparable; I=first list country's product is inferior.

Source: Compiled from data submitted in response to Commission questionnaires.

Comparison of U.S.-produced and imported silicon metal

In order to determine whether U.S.-produced silicon metal can generally be used in the same applications as imports from subject countries, U.S. producers, importers, and purchasers were asked whether the products can always, frequently, sometimes, or never be used interchangeably. As shown in table II-10, the two responding producers[39] and most metallurgical end users reported that silicon metal from all country pairs was always interchangeable. Most importers reported that product from all country pairs were frequently or sometimes interchangeable. Of the four chemical end users, two only compared U.S. and nonsubject product, reporting that these were frequently interchangeable. One chemical end user ***.[40]

[39] Producer *** did not compare the country pairs but reported that ***.
[40] One (***) reported no familiarity with products from all country pairs.

Table II-10
Silicon metal: Interchangeability between silicon metal produced in the United States and in other countries, by country pair

Country pair	Number of U.S. producers reporting				Number of U.S. importers reporting				Number of purchasers reporting (metallurgical end users)				Number of purchasers reporting (chemical end users)			
	A	F	S	N	A	F	S	N	A	F	S	N	A	F	S	N
U.S. vs. subject countries:																
U.S. vs. Bosnia and Herzegovina	2	---	---	---	2	---	4	---	7	2	1	---	---	---	1	---
U.S. vs. Iceland	2	---	---	---	2	---	4	---	7	3	---	---	---	---	1	---
U.S. vs. Kazakhstan	2	---	---	---	2	---	4	---	7	3	---	---	---	---	1	---
U.S. vs. Malaysia	2	---	---	---	2	1	3	---	7	1	---	---	---	---	1	---
Subject countries comparisons:																
Bosnia and Herzegovina vs. Iceland	2	---	---	---	3	1	4	---	5	3	---	---	---	---	1	---
Bosnia and Herzegovina vs. Kazakhstan	2	---	---	---	3	1	4	---	5	3	---	---	---	---	1	---
Bosnia and Herzegovina vs. Malaysia	2	---	---	---	3	2	3	---	6	1	---	---	---	---	1	---
Iceland vs Kazakhstan	2	---	---	---	3	1	4	---	6	3	---	---	---	---	1	---
Iceland vs Malaysia	2	---	---	---	3	2	3	---	5	1	---	---	---	---	1	---
Kazakhstan vs Malaysia	2	---	---	---	3	2	3	---	5	1	---	---	---	---	1	---
Nonsubject countries comparisons:																
U.S. vs. nonsubject	2	---	---	---	2	1	4	1	10	3	4	---	---	2	1	---
Bosnia and Herzegovina vs. nonsubject	2	---	---	---	3	1	3	---	5	2	2	---	---	---	1	---
Iceland vs. nonsubject	2	---	---	---	3	1	3	---	6	2	1	---	---	---	1	---
Kazakhstan vs. nonsubject	2	---	---	---	3	1	3	---	5	2	1	---	---	---	1	---
Malaysia vs. nonsubject	2	---	---	---	3	1	4	---	7	1	1	---	---	---	1	---

Note: A=Always, F=Frequently, S=Sometimes, N=Never.

Source: Compiled from data submitted in response to Commission questionnaires.

As can be seen from table II-11, 13 of 18 responding metallurgical end users reported that domestically produced product “always” met minimum quality specifications. Most responding metallurgical end users also reported product from subject and nonsubject sources silicon metal “always” met minimum quality specifications, including 8 of 11 for Bosnia and Herzegovina, 8 of 11 for Iceland, 5 of 9 for Kazakhstan, 6 of 10 for Malaysia, and 13 of 17 for nonsubject sources. The four chemical end users responded only for United States and nonsubject sources with respect to the ability to meet minimum quality specifications; three reported that the U.S. product “always” met their minimum standards, and the other (***) reported that U.S. product “sometimes” met its minimum quality standards. Three reported that nonsubject imports “always” met their minimum standards, ***.

Table II-11
Silicon metal: Ability to meet minimum quality specifications, by source

	Purchasers: Metallurgical end users				Purchasers: Chemical end users			
Source	Always	Usually	Sometimes	Rarely or never	Always	Usually	Sometimes	Rarely or never
United States	13	5	---	---	3	---	1	---
Bosnia and Herzegovina	8	3	---	---	---	---	---	---
Iceland	8	3	---	---	---	---	---	---
Kazakhstan	5	4	---	---	---	---	---	---
Malaysia	6	4	---	---	---	---	---	---
Nonsubject sources	13	4	---	---	3	---	---	---

Note: Purchasers were asked how often domestically produced or imported silicon metal meets minimum quality specifications for their own or their customers' uses.

Source: Compiled from data submitted in response to Commission questionnaires.

In addition, U.S. producers, importers, and purchasers were asked to assess how often differences other than price were significant in sales of silicon metal from the United States, subject, or nonsubject countries. As seen in table II-12, both responding U.S. producers reported that there were never differences other than price for all country pairs. Most importers and most metallurgical end users reported that there were sometimes or never differences other than price for all country pairs. Differences reported included the U.S. producer only making ***, and differences in availability was reported by two purchasers.

Table II-12
Silicon metal: Significance of differences other than price between silicon metal produced in the United States and in other countries, by country pair

Country pair	Number of U.S. producers reporting				Number of U.S. importers reporting				Number of purchasers reporting (metallurgical end users)				Number of purchasers reporting (chemical end users)			
	A	F	S	N	A	F	S	N	A	F	S	N	A	F	S	N
U.S. vs. subject countries:																
U.S. vs. Bosnia and Herzegovina	---	---	---	2	---	1	3	2	1	---	3	5	---	1	---	---
U.S. vs. Iceland	---	---	---	2	---	1	3	2	2	---	2	5	---	1	---	---
U.S. vs. Kazakhstan	---	---	---	2	---	1	3	2	2	---	1	6	---	1	---	---
U.S. vs. Malaysia	---	---	---	2	---	1	3	2	1	---	1	5	---	1	---	---
Subject countries comparisons:																
Bosnia and Herzegovina vs. Iceland	---	---	---	2	---	1	3	3	1	---	2	3	---	1	---	---
Bosnia and Herzegovina vs. Kazakhstan	---	---	---	2	---	1	3	3	1	---	2	3	---	1	---	---
Bosnia and Herzegovina vs. Malaysia	---	---	---	2	---	1	3	3	1	---	2	3	---	1	---	---
Iceland vs Kazakhstan	---	---	---	2	---	1	4	3	2	---	1	5	---	1	---	---
Iceland vs Malaysia	---	---	---	2	---	1	4	3	1	---	1	3	---	1	---	---
Kazakhstan vs Malaysia	---	---	---	2	---	1	4	3	1	---	1	3	---	1	---	---
Nonsubject countries comparisons:																
U.S. vs. nonsubject	---	---	---	2	1	---	5	3	3	---	7	6	---	---	2	1
Bosnia and Herzegovina vs. nonsubject	---	---	---	2	---	---	4	3	1	---	3	3	---	---	1	---
Iceland vs. nonsubject	---	---	---	2	---	---	5	3	2	---	2	4	---	---	1	---
Kazakhstan vs. nonsubject	---	---	---	2	---	---	5	3	2	---	1	4	---	---	1	---
Malaysia vs. nonsubject	---	---	---	2	---	---	5	3	1	---	1	6	---	---	1	---

Note: A = Always, F = Frequently, S = Sometimes, N = Never.

Source: Compiled from data submitted in response to Commission questionnaires.

Two of the four chemical end users included compared only U.S. and nonsubject product, reporting that there were *** differences other than price. One (***) reported that there were frequently differences other than price between all pairs, except for pairs that included nonsubject countries. For these comparisons, it reported that there were sometimes differences other than price. It further stated that it needs quality material to produce the quality products it manufactures, and this quality was not available from sources that were low cost and low price.[41]

[41] One purchaser (***) reported no familiarity with products from all country pairs.

Elasticity estimates

This section discusses elasticity estimates; parties were encouraged to comment, and their comments are included below.

U.S. supply elasticity

The domestic supply elasticity for silicon metal measures the sensitivity of the quantity supplied by U.S. producers to changes in the U.S. market price of silicon metal. The elasticity of domestic supply depends on several factors including the level of excess capacity, the ease with which producers can alter capacity, producers' ability to shift to production of other products, the existence of inventories, and the availability of alternate markets for U.S.-produced silicon metal. Analysis of these factors above indicates that the U.S. industry has a moderate ability to increase or decrease shipments to the U.S. market; an estimate in the range of 3 to 6 is suggested. Petitioners stated that "this is an acceptable range."[42]

U.S. demand elasticity

The U.S. demand elasticity for silicon metal measures the sensitivity of the overall quantity demanded to a change in the U.S. market price of silicon metal. This estimate depends on factors discussed above such as the existence, availability, and commercial viability of substitute products, as well as the component share of the silicon metal in the production of any downstream products. Based on the available information, the aggregate demand for silicon metal is likely to be very inelastic; a range of -0.25 to -0.5 is suggested.

[42] Petitioners' posthearing brief, Responses to Commissioners' questions, p. 57.

Substitution elasticity

The elasticity of substitution depends upon the extent of product differentiation between the domestic and imported products.[43] Product differentiation, in turn, depends upon such factors as quality (e.g., chemistry, appearance, etc.) and conditions of sale (e.g., availability, sales terms/discounts/promotions, etc.). Based on available information, the elasticity of substitution between U.S.-produced silicon metal and imported silicon metal differs for the two segments of the market, substitution elasticity is low for chemical end uses (which make up the majority of purchases and U.S. sales) and high for other segments, mainly aluminum end uses. The substitution elasticity for chemical end uses is likely to be low, and in the range of 1.5 to 2.5. The substitution elasticity for aluminum end uses is likely to be high, and in the range of 4 to 7.

[43] The substitution elasticity measures the responsiveness of the relative U.S. consumption levels of the subject imports and the domestic like products to changes in their relative prices. This reflects how easily purchasers switch from the U.S. product to the subject products (or vice versa) when prices change.

Part III: U.S. producers' production, shipments, and employment

The Commission analyzes a number of factors in making injury determinations (see 19 U.S.C. §§ 1677(7)(B) and 1677(7)(C)). Information on the subsidies and dumping margins was presented in *Part I* of this report and information on the volume and pricing of imports of the subject merchandise is presented in *Part IV* and *Part V*. Information on the other factors specified is presented in this section and/or *Part VI* and (except as noted) is based on the questionnaire responses of three firms that accounted for all U.S. production of silicon metal during 2020.

U.S. producers

The Commission issued a U.S. producer questionnaire to three firms based on information contained in the petition, and all three firms (DC Alabama, Globe, and MS Silicon) provided usable data on their operations.[1] Staff believes that these responses represent all U.S. production of silicon metal.

Table III-1 lists U.S. producers of silicon metal, their production locations, positions on the petition, and shares of total production.

[1] Globe's production facilities are located in Beverly, Ohio; Niagara, New York; Selma, Alabama; and Alloy, West Virginia. Its Niagara, NY and Selma, AL facilities were idled in 2018 and shut down in 2020.

Table III-1
Silicon metal: U.S. producers of silicon metal, their positions on the petition, production locations, and shares of reported production, 2020

Firm	Position on petition	Production location(s)	Share of production (percent)
DC Alabama	***	Mt. Meigs, AL	***
Globe	Petitioner	Beverly, OH Niagara Falls, NY Alloy, WV Selma, AL	***
MS Silicon	Petitioner	Burnsville, MS	***
Total			***

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent.

Source: Compiled from data submitted in response to Commission questionnaires.

Table III-2 presents information on U.S. producers' ownership, related and/or affiliated firms.

Table III-2
Silicon metal: U.S. producers' ownership, related and/or affiliated firms, 2018-20

Item / Firm	Firm Name	Affiliated/Ownership
Ownership:		
***	***	***
***	***	***
***	***	***
***	***	***
Related importers/exporters:		
***	***	***
***	***	***
Related producers:		
***	***	***
***	***	***
***	***	***
***	***	***
***	***	***
***	***	***
***	***	***
***	***	***
***	***	***

Source: Compiled from data submitted in response to Commission questionnaires.

Table III-3 presents U.S. producers' reported changes in operations since January 1, 2018.

Table III-3
Silicon metal: U.S. producers' reported changes in operations since January 1, 2018

Item / Firm	Reported changed in operations
Plant closings:	
***	***
Prolonged shutdowns or curtailments:	
***	***
***	***
***	***

Source: Compiled from data submitted in response to Commission questionnaires.

U.S. production, capacity, and capacity utilization

Table III-4 and figure III-1 present U.S. producers' production, capacity, and capacity utilization during 2018-20. From 2018 to 2020, domestic producers' capacity (for silicon metal production) decreased by *** percent. During 2018-20, domestic producers' production of silicon metal decreased by *** percent. During 2018-20, the domestic producers' capacity utilization decreased by *** percentage points. From 2018 to 2020, *** capacity and production decreased by *** percent and *** percent. During 2018-20, *** capacity and production decreased by *** percent, and *** percent. From 2018 to 2020, *** capacity remained constant and production decreased *** percent. At the Commission's hearing, MS Silicon indicated that its two furnaces have a total capacity of 36,000 metric tons per year.[2]

[2] Hearing transcript, p. 22 (Lage).

Table III-4
Silicon metal: U.S. producers' production, capacity, and capacity utilization, 2018-20

Item	Calendar year		
	2018	2019	2020
	Capacity (short tons contained silicon)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	Production (short tons contained silicon)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	Capacity utilization (percent)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	Share of production (percent)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***

Tabled continued on next page.

Table III-4--Continued
Silicon metal: U.S. producers' production, capacity, and capacity utilization, 2018-20

Item	Comparison years		
	2018-20	2018-19	2019-20
	Change in capacity (short tons contained silicon)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	▼***	▼***	▼***
	Percent change in capacity (percent)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	▼***	▼***	▼***
	Change in production (short tons contained silicon)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	▼***	▼***	▼***
	Percent change in production (percent)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	▼***	▼***	▼***
	Change in utilization (percentage points)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	▼***	▼***	▼***

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent.

Source: Compiled from data submitted in response to Commission questionnaires.

Figure III-1
Silicon metal: U.S. producers' production, capacity, and capacity utilization, 2018-20

* * * * * * *

Source: Compiled from data submitted in response to Commission questionnaires.

Alternative products

As shown in table III-5, *** of the products produced during 2020 by U.S. producers were silicon metal. One firm (***) reported producing products other than silicon metal during 2018-20. The overall capacity of U.S. producers decreased by *** percent during 2018-20. Production of silicon metal decreased by *** percent during 2018-20. Production of ferrosilicon decreased by *** from 2018-2020. Production of magnesium ferrosilicon (which accounts for all other products) increased from *** in 2018 to *** in 2019 and decreased to *** in 2020. The overall capacity utilization decreased by *** percentage points during 2018-20. Overall, out-of-scope production decreased by *** percent from 2018-2020.

Table III-5
Silicon metal: U.S. producers' overall plant capacity and production on the same equipment as subject production, 2018-20

Item	Calendar year		
	2018	2019	2020
	Quantity (short tons)		
Overall capacity	***	***	***
Production:			
Silicon metal contained weight	***	***	***
Weight of other elements	***	***	***
Silicon metal total weight	***	***	***
Ferrosilicon	***	***	***
Other products	***	***	***
Subtotal out-of-scope production	***	***	***
Total production on same machinery	***	***	***
	Ratio (percent)		
Overall capacity utilization	***	***	***
	Share of overall production (percent)		
Share of overall production:			
Silicon metal contained weight	***	***	***
Weight of other elements	***	***	***
Silicon metal total weight	***	***	***
Ferrosilicon	***	***	***
Other products	***	***	***
Subtotal out-of-scope production	***	***	***
Total production on same machinery	***	***	***
	Share of in-scope production (percent)		
Share of in-scope production:			
Silicon metal contained weight	***	***	***
Weight of other elements	***	***	***
Silicon metal total weight	***	***	***

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent.

Source: Compiled from data submitted in response to Commission questionnaires.

U.S. producers' U.S. shipments and exports

Table III-6 presents U.S. producers' U.S. shipments, export shipments, and total shipments. From 2018-20, the quantity of U.S. producers' U.S. shipments decreased by *** percent, while the value decreased by *** percent. The unit values of U.S. producers' U.S. shipments decreased by *** percent during 2018-20. Transfers to related firms decreased by *** percent during 2018-20. Transfers to related firms accounted for approximately *** percent of total shipments during 2018, and decreased in 2020, accounting for approximately *** percent of total shipments. *** accounted for the majority of transfers to related firms during 2020, while *** accounted for the majority during 2019. Export shipments accounted for *** of total shipments during 2018-20. U.S. producers' unit values for commercial shipments,

transfers to related firms, total U.S. shipments, and total shipments all decreased during 2018-20, the unit values for total shipments decreased from 2018-20.

Table III-6
Silicon metal: U.S. producers' U.S. shipments, exports shipments, and total shipments, 2018-20

Item	Calendar year		
	2018	2019	2020
	Quantity (short tons contained silicon)		
Commercial U.S. shipments	***	***	***
Transfers to related firms	***	***	***
U.S. shipments	***	***	***
Export shipments	***	***	***
Total shipments	***	***	***
	Value (1,000 dollars)		
Commercial U.S. shipments	***	***	***
Transfers to related firms	***	***	***
U.S. shipments	***	***	***
Export shipments	***	***	***
Total shipments	***	***	***
	Unit value (dollars per STCS)		
Commercial U.S. shipments	***	***	***
Transfers to related firms	***	***	***
U.S. shipments	***	***	***
Export shipments	***	***	***
Total shipments	***	***	***
	Share of quantity (percent)		
Commercial U.S. shipments	***	***	***
Transfers to related firms	***	***	***
U.S. shipments	***	***	***
Export shipments	***	***	***
Total shipments	***	***	***
	Share of value (percent)		
Commercial U.S. shipments	***	***	***
Transfers to related firms	***	***	***
U.S. shipments	***	***	***
Export shipments	***	***	***
Total shipments	***	***	***

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent.

Source: Compiled from data submitted in response to Commission questionnaires.

U.S. producers' inventories

Table III-7 presents U.S. producers' end-of-period inventories and the ratio of these inventories to U.S. producers' production, U.S. shipments, and total shipments during 2018-20. During 2018-20, end-of-period inventories decreased by *** percent. *** maintained the highest inventories each year from 2018-20.

Table III-7
Silicon metal: U.S. producers' inventories, 2018-20

Item	Calendar year		
	2018	2019	2020
	Quantity (short tons contained silicon)		
U.S. producers' end-of-period inventories	***	***	***
	Ratio (percent)		
Ratio of inventories to.--			
U.S. production	***	***	***
U.S. shipments	***	***	***
Total shipments	***	***	***

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent.

Source: Compiled from data submitted in response to Commission questionnaires.

U.S. producers' imports and purchases

U.S. producers' imports and purchases of silicon metal are presented in table III-8. As presented in table III-8, one U.S. producer *** directly imports nonsubject merchandise. *** imported silicon metal exclusively from nonsubject sources. At the Commission's hearing, petitioners indicated that Dow has two silicon metal plants in Brazil that they import from these plants for DC Alabama.[3] *** imports of silicon metal were greater than *** production from 2018-20. *** imported silicon metal from nonsubject sources, almost exclusively from Brazil. *** ratio of imports to production increased during 2018-20.[4]

[3] Hearing transcript, p. 119 (Lage).
[4] *** indicated its reason for importing as "***".
*** importer questionnaire response, section II-4.

Table III-8
Silicon metal: U.S. producers' U.S. production, imports and purchases, 2018-2020

Item	Calendar year		
	2018	2019	2020
	Quantity (short tons contained silicon)		
DC Alabama's U.S. production	***	***	***
Dow's U.S. imports from nonsubject sources (***)	***	***	***
	Ratio (percent)		
DC Alabama's ratio to U.S. production of imports from nonsubject sources (***)	***	***	***
	Narrative		
Dow's reason for importing	***		

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent.

Source: Compiled from data submitted in response to Commission questionnaires.

U.S. employment, wages, and productivity

Table III-9 shows U.S. producers' employment-related data. U.S. producers' employment measured by production and related workers (PRWs) decreased by *** percent during 2018-20. U.S. producers' total hours worked decreased by *** percent during 2018-20. U.S. producers' hourly wages increased by *** percent during 2018-20. U.S. producers' productivity decreased by *** percent during 2018-20. Unit labor costs increased by *** percent during 2018-20. At the Commission's hearing, MS Silicon indicated that it employs approximately 175 employees, which accounts for approximately 30 percent of all PRWs during 2020.[5]

Table III-9
Silicon metal: Average number of production and related workers, hours worked, wages paid to such employees, hourly wages, productivity, and unit labor costs, 2018-20

Item	Calendar year		
	2018	2019	2020
Production and related workers (PRWs) (number)	***	***	***
Total hours worked (1,000 hours)	***	***	***
Hours worked per PRW (hours)	***	***	***
Wages paid ($1,000)	***	***	***
Hourly wages (dollars per hour)	***	***	***
Productivity (STCS per 1,000 hours)	***	***	***
Unit labor costs (dollars per STCS)	***	***	***

Source: Compiled from data submitted in response to Commission questionnaires.

Captive consumption

Section 771(7)(C)(iv) of the Act states that–[6]

> *If domestic producers internally transfer significant production of the domestic like product for the production of a downstream article and sell significant production of the domestic like product in the merchant market, and the Commission finds that–*
>
> *(I) the domestic like product produced that is internally transferred for processing into that downstream article does not enter the merchant market for the domestic like product,*
>
> *(II) the domestic like product is the predominant material input in the production of that downstream article, and*

[5] Hearing transcript, p. 21 (Lage).
[6] Amended by PL 114-27 (as signed, June 29, 2015), Trade Preferences Extension Act of 2015.

then the Commission, in determining market share and the factors affecting financial performance . . ., shall focus primarily on the merchant market for the domestic like product.

Transfers and sales

As reported in table III-6 above, transfers to related firms accounted for between *** percent and *** percent of U.S. producers' U.S. shipments of silicon metal during 2018-20. *** U.S. producers reporting transferring silicon metal to related firms during 2018-20. ***[7] reported that *** silicon metal production was transferred to related firms,[8] while *** indicated that approximately *** percent of its U.S. shipments were transferred to related firms during 2020.

U.S. producer, ***, which accounted for more than *** percent of the internal transfers reported in 2020 (see table III-6) reported that all of its transfers were used to produce downstream products but did not provide usable data for the share of the downstream products that silicon accounted for indicating "***." The other U.S. producer reporting internal transfers in 2020, ***, reported that all of its transfers were used to produce two downstream products ***. Table III-10 summarizes the share that silicon accounted for in the manufacture of those two downstream products as reported by that one U.S. producer.

First statutory criterion in captive consumption

The first requirement for application of the captive consumption provision is that the domestic like product that is internally transferred for processing into that downstream article not enter the merchant market for the domestic like product. U.S. producers reported no internal consumption of silicon metal.[9] Approximately *** percent of U.S. producers' transfers to related firms during 2020 were sold as silicon metal and the remainder were processed into other products.

Second statutory criterion in captive consumption

The second criterion of the captive consumption provision concerns whether the domestic like product is the predominant material input in the production of the downstream

[7] In its posthearing brief, PCC indicated that ***. PCC posthearing brief, p. 37.

[8] At the Commission's hearing, petitioners indicated that DC Alabama's nonsubject imports are largely for captive production. Hearing transcript, pp. 119-120 (Lage).

[9] *** U.S. producers questionnaires response, II-7.

article that is captively produced. With respect to the downstream articles resulting from captive production, silicon metal reportedly comprises the minority (less than five percent) of the finished cost of a number of end-use products: electronics, solar panels, adhesives, resins, lubricants, plastomers, anti-foaming agents, semi-conductors, and water-repellent compounds.

Table III-10
Silicon metal: Firm specific data on downstream products, 2020

Item	***	***	Weighted average of both reported products
	Share of value (percent)		
Silicon metal	***	***	***
Other products	***	***	***
All material inputs	***	***	***

Source: Compiled from data submitted in response to Commission questionnaires.

Part IV: U.S. imports, apparent U.S. consumption, and market shares

U.S. importers

The Commission issued importer questionnaires to 35 firms believed to be importers of subject silicon metal, as well as to all U.S. producers of silicon metal.[1] Usable questionnaire responses were received from 16 companies, representing *** of U.S. imports from Bosnia and Herzegovina, *** of U.S. imports from Iceland, *** percent of U.S. imports from Kazakhstan, and *** of U.S. imports from Malaysia in 2020 under HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000.[2] The 16 questionnaire responses represented *** U.S. imports from the combined subject sources, *** U.S. imports from nonsubject sources, and *** from all import sources, during 2020.[3] Public official Commerce statistics are presented throughout this report (as opposed to country-specific confidential questionnaire responses), unless specifically indicated otherwise.[4] Table IV-1 lists all responding U.S. importers of silicon metal from Bosnia and Herzegovina, Iceland, Kazakhstan, Malaysia, and other sources, their locations, and their shares of U.S. imports, in 2020.

[1] The Commission issued questionnaires to those firms identified in the petitions, may have accounted for more than one percent of total imports under HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000 in 2020.

[2] The coverage estimates presented are calculated from official U.S. import statistics based on General Imports. General Imports measure the total physical arrivals of merchandise from foreign countries, whether such merchandise enters the U.S. customs territory immediately or is entered into bonded warehouses or FTZs under Customs custody.

[3] Based on official import statistics, approximately 137,133 short tons of imports of silicon metal arrived into the United States from all sources in 2020. The 16 questionnaire responses for all imports of silicon metal accounted for approximately *** short tons of silicon metal arriving in the United States in 2020, which accounted for approximately *** percent of all U.S. imports of silicon metal from all sources during 2020. Imports of silicon metal to the United States that left their destination in late 2019 could (possibly) be attributed to the overreporting of imports of silicon metal in 2020.

[4] U.S. import statistics presented in this report are based on General U.S. imports (as opposed to imports for consumption) due to issues with country of origin reporting and product classification reporting that result from certain U.S. importers' use of foreign trade zones (FTZs) for their importation of silicon metal. Since U.S. import statistics are presented on the basis of General U.S. Imports, values are reported on a CIF basis as opposed to a LDPV basis.

Table IV-1
Silicon metal: U.S. importers, their headquarters, and share of total imports by source, 2020

Firm	Headquarters	Share of imports by source (percent)			
		Bosnia and Herzegovina	Iceland	Kazakhstan	Malaysia
BIT Metals	Amstelveen, NL	***	***	***	***
CCMA	Amherst, NY	***	***	***	***
Dow	Midland, MI	***	***	***	***
Elkem	Moon Township, PA	***	***	***	***
Greenwich	Greenwich, CT	***	***	***	***
Grupo FerroAtlantica	Madrid, Spain	***	***	***	***
Laurand	Boca Raton, FL	***	***	***	***
Momentive	Waterford, NY	***	***	***	***
MPSAC	Theodore, AL	***	***	***	***
MTALX	London, UK	***	***	***	***
Polymet	Birmingham, AL	***	***	***	***
REC	Moses Lake, WA	***	***	***	***
Simcoa	Wellesley, WA	***	***	***	***
Standard Resources	Cherry Hill, NJ	***	***	***	***
Tennant	Chesterfield UK	***	***	***	***
WPNA	Charleston, TN	***	***	***	***
Total		***	***	***	***

Table continued on next page.

Table IV-1--Continued
Silicon metal: U.S. importers, their headquarters, and share of total imports by source, 2020

Firm	Headquarters	Share of imports by source (percent)		
		Subject sources	Nonsubject sources	All import sources
BIT Metals	Amstelveen, NL	***	***	***
CCMA	Amherst, NY	***	***	***
Dow	Midland, MI	***	***	***
Elkem	Moon Township, PA	***	***	***
Greenwich	Greenwich, CT	***	***	***
Grupo FerroAtlantica	Madrid, Spain	***	***	***
Laurand	Boca Raton, FL	***	***	***
Momentive	Waterford, NY	***	***	***
MPSAC	Theodore, AL	***	***	***
MTALX	London, UK	***	***	***
Polymet	Birmingham, AL	***	***	***
REC	Moses Lake, WA	***	***	***
Simcoa	Wellesley, WA	***	***	***
Standard Resources	Cherry Hill, NJ	***	***	***
Tennant	Chesterfield UK	***	***	***
WPNA	Charleston, TN	***	***	***
All firms		***	***	***

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent.

Source: Compiled from data submitted in response to Commission questionnaires.

U.S. imports

Table IV-2 and figure IV-1 present data for U.S. imports of silicon metal from Bosnia and Herzegovina, Iceland, Kazakhstan, Malaysia, and all other sources. The quantity of silicon metal imports from the subject countries increased by 118.7 percent from 2018 to 2019, but decreased by 14.5 percent from 2019 to 2020. The quantity of silicon metal imports from the subject countries increased overall by 86.9 percent during 2018-20. The value of silicon metal imports from the subject countries increased by 34.5 percent from 2018 to 2020. As a share of total imports, subject imports (based on quantity) increased from 10.3 percent in 2018 to 19.1 percent in 2019, however decreased to 18.6 percent in 2020. The average unit values of silicon metal imports from the subject countries were lower than those reported for nonsubject imports in 2018-20 but decreased by 28.1 percent during the same period (2018-20).

The quantity of silicon metal imports from all nonsubject countries decreased by 6.2 percent from 2018 to 2020. The value of silicon metal imports from all nonsubject countries followed a similar trend, decreasing by 27.0 percent from 2018 to 2020. The average unit value of silicon metal imports from nonsubject countries decreased by 22.2 percent during 2018-20.

The ratio of subject import volume to U.S. production increased from *** percent in 2018 to *** percent in 2020. The ratio of nonsubject import volume to U.S. production increased from *** percent in 2018 to *** in 2020. The ratio of total import volume to U.S. production increased from *** percent in 2018 to *** in 2020.

Table IV-2
Silicon metal: U.S. imports by source, 2018-20

Item	Calendar year		
	2018	2019	2020
	Quantity (short tons contained silicon)		
U.S. imports from.--			
Bosnia and Herzegovina	9,350	10,493	8,319
Iceland	1,259	6,947	4,986
Kazakhstan	3,045	8,522	1,219
Malaysia	---	3,894	11,000
Subject sources	13,654	29,857	25,523
Nonsubject sources	118,966	126,190	111,609
All import sources	132,620	156,047	137,133
	Value (1,000 dollars)		
U.S. imports from.--			
Bosnia and Herzegovina	21,653	20,079	14,562
Iceland	2,369	11,711	7,182
Kazakhstan	6,064	15,171	1,800
Malaysia	---	6,595	16,912
Subject sources	30,086	53,556	40,456
Nonsubject sources	315,333	301,596	230,038
All import sources	345,419	355,152	270,494
	Unit value (dollars per STCS)		
U.S. imports from.--			
Bosnia and Herzegovina	2,316	1,913	1,751
Iceland	1,882	1,686	1,440
Kazakhstan	1,991	1,780	1,477
Malaysia	---	1,693	1,538
Subject sources	2,203	1,794	1,585
Nonsubject sources	2,651	2,390	2,061
All import sources	2,605	2,276	1,972

Table continued on next page.

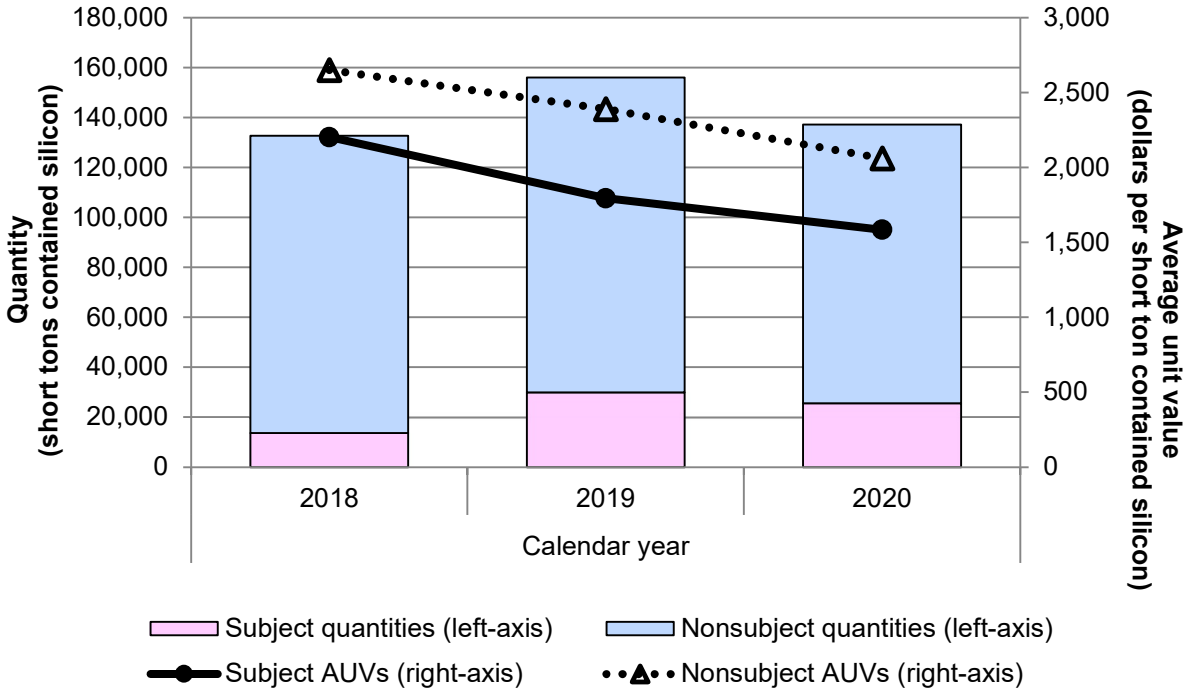
Table IV-2--Continued
Silicon metal: U.S. imports by source, 2018-20

Item	Calendar year		
	2018	2019	2020
	Share of quantity (percent)		
U.S. imports from.--			
Bosnia and Herzegovina	7.0	6.7	6.1
Iceland	0.9	4.5	3.6
Kazakhstan	2.3	5.5	0.9
Malaysia	---	2.5	8.0
Subject sources	10.3	19.1	18.6
Nonsubject sources	89.7	80.9	81.4
All import sources	100.0	100.0	100.0
	Share of value (percent)		
U.S. imports from.--			
Bosnia and Herzegovina	6.3	5.7	5.4
Iceland	0.7	3.3	2.7
Kazakhstan	1.8	4.3	0.7
Malaysia	---	1.9	6.3
Subject sources	8.7	15.1	15.0
Nonsubject sources	91.3	84.9	85.0
All import sources	100.0	100.0	100.0
	Ratio to U.S. production		
U.S. imports from.--			
Bosnia and Herzegovina	***	***	***
Iceland	***	***	***
Kazakhstan	***	***	***
Malaysia	***	***	***
Subject sources	***	***	***
Nonsubject sources	***	***	***
All import sources	***	***	***

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent. STCS-Short tons contained silicon. U.S. imports based on general imports. Value of imports based on CIF value (customs value plus insurance and freight).

Source: Compiled from official U.S. import statistics based on General Imports using HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed February 6, 2021.

Figure IV-1
Silicon metal: U.S. imports by source, 2018-20



Source: Compiled from official U.S. import statistics based on General Imports using HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed February 6, 2021.

Nonsubject imports

Table IV-3 presents data for U.S. imports of silicon metal from nonsubject sources and from all nonsubject sources that were previously investigated. The quantity of silicon metal imports from all sources that were previously investigated increased by 25.6 percent from 2018 to 2020. The value of silicon metal imports from all sources that were previously investigated increased by 13.2 percent from 2018 to 2019 and decreased from 2019 to 2020 by 12.9 percent. During 2018-20 the overall value of silicon metal imports from all sources that were previously investigated decreased by 1.4 percent. As a share of total imports, imports of all sources that were previously investigated, based on quantity, increased by 18.9 percentage points during 2018-20. The average unit values of silicon metal imports from all sources that were previously investigated decreased by 21.5 percent during 2018-20. As a share of total imports, imports of all sources that were previously investigated, based on value, increased by 19.0 percentage points during 2018-20.

Table IV-3
Silicon metal: U.S. imports by nonsubject source, 2018-20

Item	Calendar year		
	2018	2019	2020
	Quantity (STCS)		
U.S. imports from nonsubject sources.-- Argentina	---	---	---
Australia	4,344	7,405	8,038
Brazil	40,764	57,067	54,879
China	221	207	269
Norway	21,358	18,532	20,566
Russia	---	---	---
All sources previously investigated	66,687	83,211	83,753
Of which, recently previously investigated	66,466	83,004	83,484
Of which, currently under order	221	207	269
Canada	29,914	31,371	23,525
Laos	2,712	3,226	786
Thailand	18,439	6,125	1,857
All other sources	1,213	2,256	1,688
Nonsubject sources	118,966	126,190	111,609
	Value (1,000 dollars)		
U.S. imports from nonsubject sources.-- Argentina	---	---	---
Australia	11,163	17,208	15,844
Brazil	107,071	137,708	112,898
China	334	275	310
Norway	55,104	41,340	42,120
Russia	---	---	---
All sources previously investigated	173,672	196,531	171,172
Of which, recently previously investigated	173,338	196,257	170,862
Of which, currently under order	334	275	310
Canada	82,733	78,039	50,629
Laos	6,484	8,207	1,666
Thailand	50,536	14,329	3,253
All other sources	1,907	4,490	3,318
Nonsubject sources	315,333	301,596	230,038

Table continued on next page.

Table IV-3 –Continued
Silicon metal: U.S. imports by nonsubject source, 2018-20

Item	Calendar year		
	2018	2019	2020
	Unit value (dollars per STCS)		
U.S. imports from nonsubject sources.-- Argentina	---	---	---
Australia	2,570	2,324	1,971
Brazil	2,627	2,413	2,057
China	1,514	1,325	1,151
Norway	2,580	2,231	2,048
Russia	---	---	---
All sources previously investigated	2,604	2,362	2,044
Of which, recently previously investigated	2,608	2,364	2,047
Of which, currently under order	1,514	1,325	1,151
Canada	2,766	2,488	2,152
Laos	2,391	2,544	2,121
Thailand	2,741	2,339	1,752
All other sources	1,572	1,990	1,965
Nonsubject sources	2,651	2,390	2,061
	Share of quantity of total imports (percent)		
U.S. imports from nonsubject sources.-- Argentina	---	---	---
Australia	3.3	4.7	5.9
Brazil	30.7	36.6	40.0
China	0.2	0.1	0.2
Norway	16.1	11.9	15.0
Russia	---	---	---
All sources previously investigated	50.3	53.3	61.1
Of which, recently previously investigated	50.1	53.2	60.9
Of which, currently under order	0.2	0.1	0.2
Canada	22.6	20.1	17.2
Laos	2.0	2.1	0.6
Thailand	13.9	3.9	1.4
All other sources	0.9	1.4	1.2
Nonsubject sources	89.7	80.9	81.4

Table continued on next page.

Table IV-3 –Continued
Silicon metal: U.S. imports by nonsubject source, 2018-20

Item	Calendar year		
	2018	2019	2020
	Share of value of total imports (percent)		
U.S. imports from nonsubject sources.--			
Argentina	---	---	---
Australia	3.2	4.8	5.9
Brazil	31.0	38.8	41.7
China	0.1	0.1	0.1
Norway	16.0	11.6	15.6
Russia	---	---	---
All sources previously investigated	50.3	55.3	63.3
Of which, recently previously investigated	50.2	55.3	63.2
Of which, currently under order	0.1	0.1	0.1
Canada	24.0	22.0	18.7
Laos	1.9	2.3	0.6
Thailand	14.6	4.0	1.2
All other sources	0.6	1.3	1.2
Nonsubject sources	91.3	84.9	85.0

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent. STCS-Short tons contained silicon. U.S. imports based on general imports.

Source: Compiled from official U.S. import statistics based on General Imports using HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed February 6, 2021.

Critical circumstances

On October 20, 2020, the petitioners filed critical circumstances allegation that critical circumstances exist with respect to imports of subject merchandise from Iceland. On November 5, 2020, Commerce determined the allegation was insufficient and informed the petitioners that it had no basis to pursue critical circumstances at this time. On November 11, 2020, the petitioners timely filed an updated critical circumstances allegation at that time. On February 26, 2021, Commerce issued its final determination that "critical circumstances" exist with regard to imports from Iceland of silicon metal from PCC Bakki Silicon hf and all other producers/exporters from Iceland.[5] In this investigation, if both Commerce and the Commission make affirmative final critical circumstances determinations, certain subject imports may be

[5] 86 FR 11720, February 26, 2021. referenced in app. A. When petitioners file timely allegations of critical circumstances, Commerce examines whether there is a reasonable basis to believe or suspect that (1) either there is a history of dumping and material injury by reason of dumped imports in the United States or elsewhere of the subject merchandise, or the person by whom, or for whose account, the merchandise was imported knew or should have known that the exporter was selling the subject merchandise at LTFV and that there was likely to be material injury by reason of such sales; and (2) there have been massive imports of the subject merchandise over a relatively short period.

subject to antidumping duties retroactive by 90 days from December 11, 2020, the effective date of Commerce's preliminary affirmative LTFV determinations for Bosnia and Herzegovina and Iceland. Table IV-4 and figure IV-2 present data for certain imports of silicon metal from Iceland during January 2020 through December 2020. Presented in appendix H are *** end-of-period inventories for the U.S. imports from Iceland during the last six months of 2020 (July-December).

Table IV-4
Silicon metal: U.S. imports subject to Commerce's final AD critical circumstances determination for certain U.S. imports from Iceland, January 2020 to December 2020

Month	Actual monthly quantity (STCS)	Outwardly cumulative subtotals (STCS)	Percentage change from comparable period (percent)
2020.--			
January	197	2,002	
February	551	1,805	
March	770	1,254	
April	176	483	
May	285	307	
June	22	22	
Petition file date: June 30, 2020			
July	1,425	1,425	▲6,319.0
August	257	1,682	▲447.4
September	356	2,038	▲321.7
October	239	2,277	▲81.6
November	415	2,693	▲49.2
December	292	2,984	▲49.1

Note: The percent increase or (decrease) over the comparable pre-petition period.

Note: U.S. imports include imports from Iceland from all suppliers during critical circumstance period.

Source: Compiled from official U.S. import statistics based on General Imports using HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed February 6, 2021.

Figure IV-2
Silicon metal: U.S. imports subject to Commerce's final AD critical circumstances determination for certain U.S. imports from Iceland, January 2020 to December 2020

* * * * * * *

Note: U.S. imports include general imports from Iceland from all suppliers during critical circumstance period.

Source: Compiled from official U.S. import statistics based on General Imports using HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed February 6, 2021.

Negligibility

The statute requires that an investigation be terminated without an injury determination if imports of the subject merchandise are found to be negligible.[6] Negligible imports are generally defined in the Act, as amended, as imports from a country of merchandise corresponding to a domestic like product where such imports account for less than 3 percent of the volume of all such merchandise imported into the United States in the most recent 12-month period for which data are available that precedes the filing of the petition or the initiation of the investigation. However, if there are imports of such merchandise from a number of countries subject to investigations initiated on the same day that individually account for less than 3 percent of the total volume of the subject merchandise, and if the imports from those countries collectively account for more than 7 percent of the volume of all such merchandise imported into the United States during the applicable 12-month period, then

[6] Sections 703(a)(1), 705(b)(1), 733(a)(1), and 735(b)(1) of the Act (19 U.S.C. §§ 1671b(a)(1), 1671d(b)(1), 1673b(a)(1), and 1673d(b)(1)).

imports from such countries are deemed not to be negligible.[7] Table IV-5 presents data on U.S. imports of silicon metal in the twelve months preceding the filing of the petitions (June 2019-May 2020). Imports from Bosnia and Herzegovina, Iceland, Kazakhstan, and Malaysia collectively accounted for 20.8 percent of total imports by quantity during June 2019 through May 2020.

Table IV-5
Silicon metal: U.S. imports in the twelve-month period preceding the filing of the petition, June 2019 through May 2020

Item	June 2019 through May 2020	
	Quantity (short tons contained silicon)	Share quantity (percent)
U.S. imports from.--		
Bosnia and Herzegovina	9,609	7.3
Iceland	5,455	4.2
Kazakhstan	3,966	3.0
Malaysia	7,576	5.8
Subject sources	26,607	20.3
Nonsubject sources	114,160	87.3
All import sources	130,794	100.0

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent.

Source: Official U.S. import statistics based on General Imports using HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed February 6, 2021.

Cumulation considerations

In assessing whether imports should be cumulated, the Commission determines whether U.S. imports from the subject countries compete with each other and with the domestic like product and has generally considered four factors: (1) fungibility, (2) presence of sales or offers to sell in the same geographical markets, (3) common or similar channels of distribution, and (4) simultaneous presence in the market. Information regarding channels of distribution, market areas, and interchangeability appear in Part II. Additional information concerning fungibility, geographical markets, and simultaneous presence in the market is presented below.

[7] Section 771 (24) of the Act (19 U.S.C § 1677(24)).

Fungibility

The Commission requested information concerning U.S. producers' and U.S. importers' U.S. shipments of silicon metal, by grade, for calendar year 2020. These data are presented in table IV-6 and figure IV-3.

U.S. producers' U.S. shipments of metallurgical grade silicon metal accounted for *** percent of total U.S. producer commercial shipments. Metallurgical silicon metal accounted for the largest share of reported U.S. shipments for U.S. producers and for U.S. importers' U.S. shipments from both subject and nonsubject sources (which combined accounted for *** percent of total U.S. commercial shipments). At the Commission's hearing, the petitioners indicated that metallurgical grade silicon metal was most commonly sold in the secondary aluminum market.[8] In 2020, ***.[9]

[8] Hearing transcript, pp. 55-56 (Bowes).
[9] *** U.S. importer questionnaire, section II-4.

Table IV-6
Silicon metal: U.S. producers' and U.S. importers' U.S. shipments by grade, 2020

Source	High purity grade	Metallurgical grade	All grades
	Quantity (short tons contained silicon)		
U.S. producers' U.S. shipments	***	***	***
U.S. importers' U.S. shipments from.--			
Bosnia and Herzegovina	***	***	***
Iceland	***	***	***
Kazakhstan	***	***	***
Malaysia	***	***	***
Subject sources	***	***	***
Nonsubject sources	***	***	***
All import sources	***	***	***
U.S. producers' and U.S. importers' U.S. shipments	***	***	***
	Share across (percent)		
U.S. producers' U.S. shipments	***	***	***
U.S. importers' U.S. shipments.--			
Bosnia and Herzegovina	***	***	***
Iceland	***	***	***
Kazakhstan	***	***	***
Malaysia	***	***	***
Subject sources	***	***	***
Nonsubject sources	***	***	***
All import sources	***	***	***
U.S. producers' and U.S. importers' U.S. shipments	***	***	***
	Share down (percent)		
U.S. producers' U.S. shipments	***	***	***
U.S. importers' U.S. shipments.--			
Bosnia and Herzegovina	***	***	***
Iceland	***	***	***
Kazakhstan	***	***	***
Malaysia	***	***	***
Subject sources	***	***	***
Nonsubject sources	***	***	***
All import sources	***	***	***
U.S. producers' and U.S. importers' U.S. shipments	***	***	***

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent.

Source: Compiled from data submitted in response to Commission questionnaires.

Figure IV-3
Silicon metal: U.S. producers' and U.S. importers' U.S. shipments by grade, 2020

* * * * * * *

Source: Compiled from data submitted in response to Commission questionnaires.

Geographical markets

Silicon metal produced in the United States is shipped nationwide.[10] In 2020, official import statistics show that 93.1 percent of subject imports entered through the Eastern border of entry of the United States, followed by the Western, Northern, and Southern borders of entry with 5.5, 1.4, and 0.0 percent, respectively. In 2020, nonsubject imports accounted for 44.6 percent of imports of silicon metal that entered the United States through the Northern border with the largest amount of silicon metal by quantity at 49,777 short tons. Table IV-7 presents U.S. import quantities of silicon metal sources and border of entry during 2020.[11]

[10] See Part II for additional information on geographic markets.

[11] The "East" border of entry includes the following Customs entry districts for silicon metal: Baltimore, MD; Charleston, SC; Charlotte, NC; New York, NY; Norfolk, VA; Ogdensburg, NY; Philadelphia, PA; Savannah, GA; and St. Albans, VT. The "North" border of entry includes the following Customs entry districts for silicon metal: Chicago, IL; Cleveland, OH; Detroit, MI; Great Falls, MT; Minneapolis, MN; and St. Louis, MO. The "South" border of entry includes the following Customs entry districts for silicon metal: Dallas-Fort Worth, TX; Houston-Galveston, TX; Miami, FL; New Orleans, LA; and Tampa, FL. The "West" border of entry includes the following Customs entry districts for silicon metal: Los Angeles, CA; San Francisco, CA; and Seattle, WA.

Table IV-7
Silicon metal: U.S. imports by border of entry, 2020

Item	Border of entry				
	East	North	South	West	All borders
	Quantity (short tons contained silicon)				
U.S. imports from.--					
Bosnia and Herzegovina	6,913	---	---	1,406	8,319
Iceland	4,893	93	---	---	4,986
Kazakhstan	1,219	---	---	---	1,219
Malaysia	10,733	267	---	---	11,000
Subject sources	23,757	360	---	1,406	25,523
Nonsubject sources	36,433	49,777	20,068	5,331	111,609
All import sources	60,191	50,137	20,068	6,737	137,133
	Share across (percent)				
U.S. imports from.--					
Bosnia and Herzegovina	83.1	---	---	16.9	100.0
Iceland	98.1	1.9	---	---	100.0
Kazakhstan	100.0	---	---	---	100.0
Malaysia	97.6	2.4	---	---	100.0
Subject sources	93.1	1.4	---	5.5	100.0
Nonsubject sources	32.6	44.6	18.0	4.8	100.0
All import sources	43.9	36.6	14.6	4.9	100.0
	Share down (percent)				
U.S. imports from.--					
Bosnia and Herzegovina	11.5	---	---	20.9	6.1
Iceland	8.1	0.2	---	---	3.6
Kazakhstan	2.0	---	---	---	0.9
Malaysia	17.8	0.5	---	---	8.0
Subject sources	39.5	0.7	---	20.9	18.6
Nonsubject sources	60.5	99.3	100.0	79.1	81.4
All import sources	100.0	100.0	100.0	100.0	100.0

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent.

Source: Compiled from official U.S. import statistics based on General Imports using HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed February 6, 2021.

Presence in the market

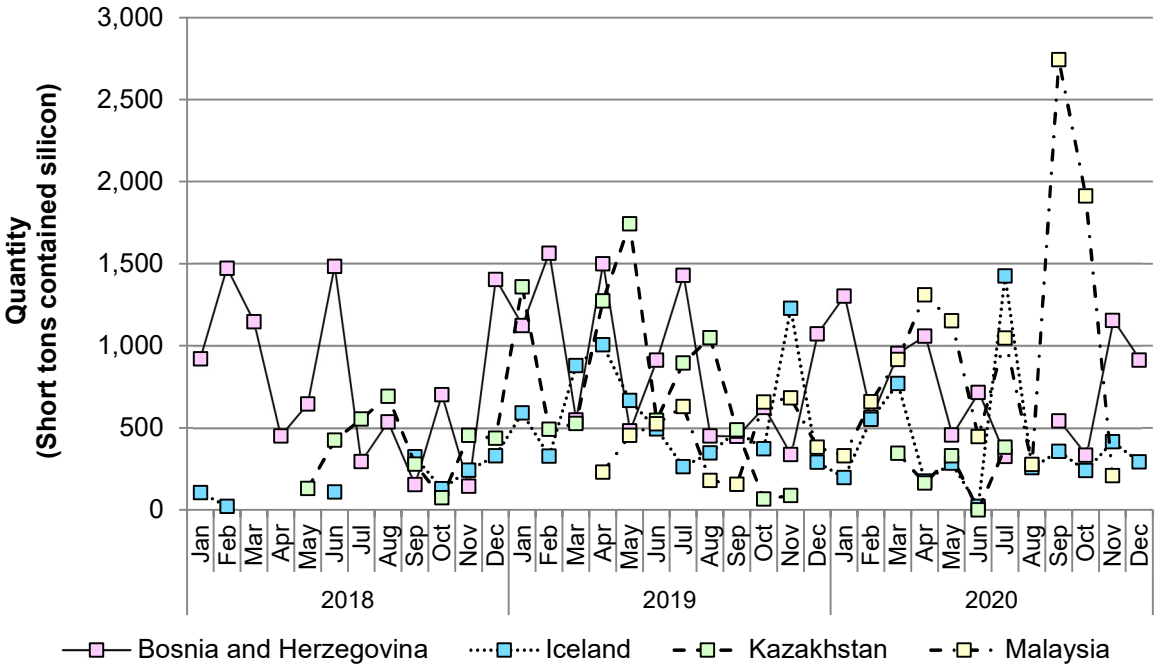
Table IV-8 and figures IV-4 and IV-5 present monthly official U.S. import statistics for subject countries and nonsubject sources. The monthly import statistics indicate that U.S. imports of silicon metal from two of the subject countries, Bosnia and Herzegovina and Iceland, were present in nearly each month during January 2018 to December 2020. Imports from Bosnia and Herzegovina were present for 35 months of the 36 month period. Imports from Iceland were present for 31 months of the 36 month period. Imports from Kazakhstan were present for 23 months of the 36 month period. While imports from Malaysia were present for 20 months of the 36 month period.

Table IV-8
Silicon metal: U.S. imports by month, January 2018 through December 2020

U.S. imports	Bosnia and Herzegovina	Iceland	Kazakhstan	Malaysia	Subject sources	Nonsubject sources	All import sources
	Quantity (short tons contained silicon)						
2018.--							
January	920	106	---	---	1,026	8,339	9,365
February	1,472	22	---	---	1,494	9,642	11,136
March	1,146	---	---	---	1,146	11,512	12,658
April	450	---	---	---	450	10,090	10,540
May	645	---	130	---	775	18,522	19,297
June	1,483	109	424	---	2,017	7,474	9,491
July	294	---	553	---	847	9,012	9,859
August	536	---	692	---	1,228	8,398	9,626
September	154	324	279	---	757	8,358	9,114
October	702	128	74	---	905	9,681	10,585
November	144	241	455	---	840	7,217	8,058
December	1,403	329	437	---	2,169	10,720	12,889
2019.--							
January	1,124	591	1,360	---	3,074	12,155	15,230
February	1,564	328	491	---	2,383	8,515	10,898
March	549	879	527	---	1,955	17,266	19,221
April	1,499	1,007	1,273	230	4,009	13,710	17,719
May	481	667	1,742	455	3,345	9,972	13,317
June	913	494	546	524	2,476	10,100	12,576
July	1,430	263	895	630	3,217	9,706	12,923
August	451	348	1,048	179	2,026	8,100	10,126
September	449	480	487	156	1,573	9,526	11,099
October	624	372	66	657	1,719	10,038	11,758
November	337	1,228	87	682	2,335	8,043	10,378
December	1,072	290	---	382	1,744	9,057	10,801
2020.--							
January	1,301	197	---	330	1,828	10,731	12,559
February	563	551	---	659	1,773	5,988	7,761
March	953	770	345	917	2,985	7,950	10,936
April	1,059	176	164	1,310	2,709	7,624	10,333
May	455	285	329	1,152	2,222	7,323	9,545
June	715	22	---	446	1,184	6,166	7,349
July	326	1,425	381	1,048	3,180	15,511	18,691
August	---	257	---	276	533	10,854	11,387
September	543	356	---	2,743	3,642	8,309	11,950
October	334	239	---	1,912	2,485	11,276	13,760
November	1,155	415	---	208	1,778	9,501	11,280
December	913	292	---	---	1,205	10,375	11,580

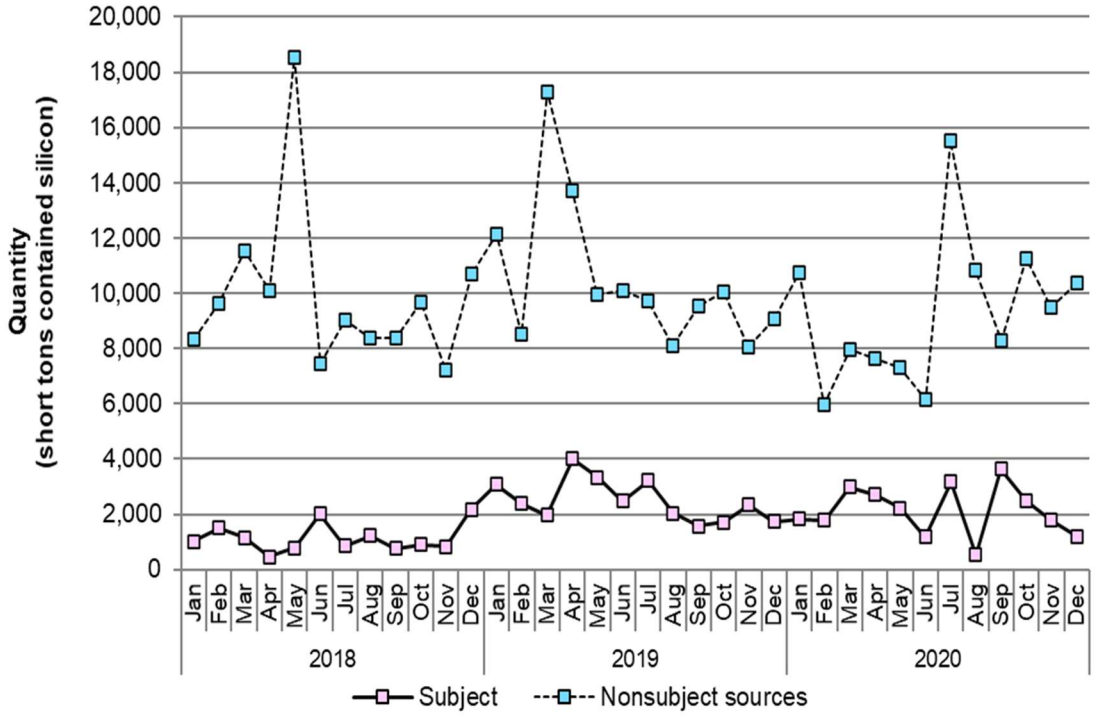
Source: Compiled from official U.S. import statistics based on General Imports using HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed February 6, 2021.

Figure IV-4
Silicon metal: U.S. imports from individual subject sources, January 2018 through December 2020



Source: Compiled from official U.S. import statistics based on General Imports using HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed February 6, 2021.

Figure IV-5
Silicon metal: U.S. imports from aggregated subject and nonsubject sources, January 2018 through March 2020



Source: Compiled from official U.S. import statistics based on General Imports using HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed February 6, 2021.

Apparent U.S. consumption

Table IV-9 and figure IV-6 present data on apparent U.S. consumption for silicon metal during 2018-20. During 2018-20, U.S. apparent consumption, based on quantity decreased by *** percent and, U.S. apparent consumption, based on value, decreased by *** percent.

Table IV-9
Silicon metal: Apparent U.S. consumption, 2018-20

Item	Calendar year		
	2018	2019	2020
	Quantity (short tons contained silicon)		
U.S. producers' U.S. shipments.--			
DC Alabama	***	***	***
Globe	***	***	***
MS silicon	***	***	***
All U.S. producers	***	***	***
U.S. imports from.--			
Bosnia and Herzegovina	9,350	10,493	8,319
Iceland	1,259	6,947	4,986
Kazakhstan	3,045	8,522	1,219
Malaysia	---	3,894	11,000
Subject sources	13,654	29,857	25,523
Nonsubject sources	118,966	126,190	111,609
All import sources	132,620	156,047	137,133
Apparent U.S. consumption	***	***	***
	Value (1,000 dollars)		
U.S. producers' U.S. shipments.--			
DC Alabama	***	***	***
Globe	***	***	***
MS silicon	***	***	***
All U.S. producers	***	***	***
U.S. imports from.--			
Bosnia and Herzegovina	21,653	20,079	14,562
Iceland	2,369	11,711	7,182
Kazakhstan	6,064	15,171	1,800
Malaysia	---	6,595	16,912
Subject sources	30,086	53,556	40,456
Nonsubject sources	315,333	301,596	230,038
All import sources	345,419	355,152	270,494
Apparent U.S. consumption	***	***	***

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent.

Source: Compiled from data submitted in response to Commission questionnaires and official U.S. import statistics based on General Imports using HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed February 6, 2021.

Figure IV-6
Silicon metal: Apparent U.S. consumption, 2018-20

* * * * * * *

Source: Compiled from data submitted in response to Commission questionnaires and official U.S. import statistics based on General Imports using HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed February 6, 2021.

U.S. market shares

U.S. market share data are presented in table IV-10. U.S. producers' share of apparent U.S. consumption by quantity, decreased from *** percent in 2018 to *** percent in 2019 before increasing to *** percent in 2020 with an overall decrease of *** percentage points during 2018-20. U.S. producers' share of apparent U.S. consumption by value, decreased from *** percent in 2018 to *** percent in 2019, but increased to *** percent in 2020, with an overall decrease of *** percentage points during 2018-20. Subject imports' share of the U.S. market by quantity increased from *** percent in 2018 to *** percent in 2019 before decreasing slightly to *** percent in 2020. Subject imports' share of the U.S. market by value, increased from *** percent in 2018 to *** percent in 2019 before decreasing to *** percent in 2020. Meanwhile, the share of nonsubject imports based on quantity, increased by *** percentage points from 2018 to 2020. The share of nonsubject imports based on value increased by *** percentage points during 2018-20.

Table IV-10
Silicon metal: Market shares, 2018-20

Item	Calendar year		
	2018	2019	2020
	Quantity (short tons contained silicon)		
Apparent U.S. consumption	***	***	***
	Share of quantity (percent)		
U.S. producers' U.S. shipments.--			
DC Alabama	***	***	***
Globe	***	***	***
MS silicon	***	***	***
All U.S. producers	***	***	***
U.S. imports from.--			
Bosnia and Herzegovina	***	***	***
Iceland	***	***	***
Kazakhstan	***	***	***
Malaysia	***	***	***
Subject sources	***	***	***
Nonsubject sources	***	***	***
All import sources	***	***	***
	Value (1,000 dollars)		
Apparent U.S. consumption	***	***	***
	Share of value (percent)		
U.S. producers' U.S. shipments.--			
DC Alabama	***	***	***
Globe	***	***	***
MS silicon	***	***	***
All U.S. producers	***	***	***
U.S. imports from.--			
Bosnia and Herzegovina	***	***	***
Iceland	***	***	***
Kazakhstan	***	***	***
Malaysia	***	***	***
Subject sources	***	***	***
Nonsubject sources	***	***	***
All import sources	***	***	***

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent.

Source: Compiled from data submitted in response to Commission questionnaires and official U.S. import statistics based on General Imports using HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed February 6, 2021.

Part V: Pricing data

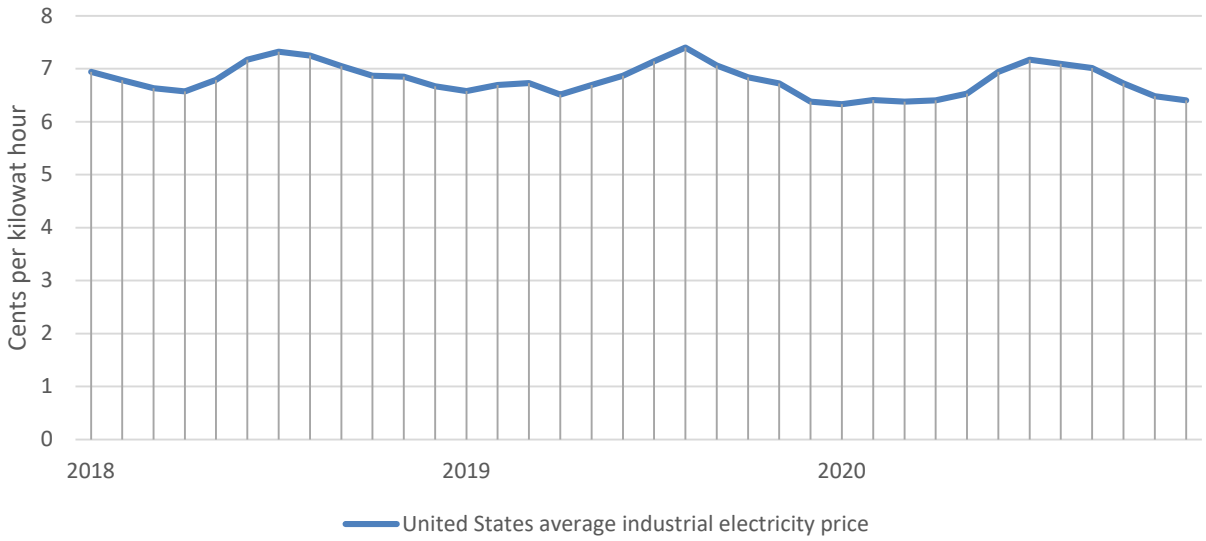
Factors affecting prices

Raw material costs

Silicon metal is produced from mined quartzite and consists almost entirely of elemental silicon with very small amounts of impurities (such as iron, calcium, and aluminum). U.S. producers reported that raw materials as a share of cost of goods sold decreased from *** percent in 2018 to *** percent in 2020.[1]

The cost of electricity is another important cost in the production of silicon metal. Electricity prices typically fluctuate over the year, typically reaching their peak in July; however, the price in August 2019 was the highest for the whole period while the January 2020 price was the lowest (figure V-1).

Figure V-1
Electricity prices: U.S. average retail price of electricity, industrial, monthly, January 2018-December 2020



Source: U.S. Energy Information Administration, https://www.eia.gov/electricity/data/browser/#/topic/7, retrieved March 8, 2021.

[1] See part VI for more information on this trend.

Transportation costs to the U.S. market

Transportation costs for silicon metal shipped from subject countries to the United States averaged 3.0 percent for Bosnia and Herzegovina, 1.1 percent for Iceland, 1.5 percent for Kazakhstan, and 4.6 percent for Malaysia during 2019. These estimates were derived from official import data and represent the transportation and other charges on imports.[2]

U.S. inland transportation costs

Two of 3 responding U.S. producers and 9 of 11 responding importers reported that they typically arrange transportation to their customers. Most responding U.S. producers and importers reported that their U.S. inland transportation costs ranged from 2 to 4 percent.

Pricing practices

Pricing methods

U.S. producers and importers reported mainly using transaction-by-transaction negotiations and contracts for determining their sales prices for silicon metal (table V-1). *** three importers also reported using CRU or Platts indexes in determining their contract prices.

Table V-1
Silicon metal: U.S. producers' and importers' reported price setting methods, by number of responding firms

Method	U.S. producers	Importers
Transaction-by-transaction	3	11
Contract	2	10
Set price list	---	---
Other	1	2
Responding firms	3	13

Note: The sum of responses down may not add up to the total number of responding firms as each firm was instructed to check all applicable price setting methods employed.

Source: Compiled from data submitted in response to Commission questionnaires.

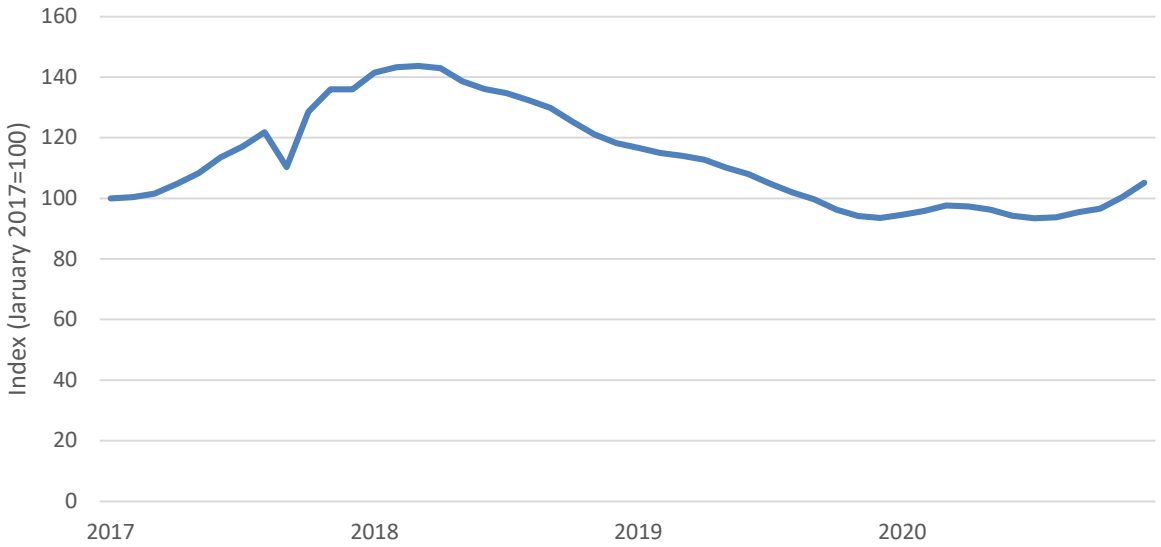
[2] The estimated transportation costs were obtained by subtracting the customs value from the c.i.f. value of the imports for 2019 and then dividing by the customs value based on the HTS subheading 2804.69.1000 and 2804.69.5000.

Pricing index

A published price index for metallurgical grade silicon metal is readily available and is reported to be used by some purchasers as part of contract negotiations with suppliers (figure V-2).[3]

Figure V-2

Silicon metal: Published price index of silicon metal, duty paid, delivered Midwest, U.S. spot and imported 553 grade silicon metal (minimum 98.5% silicon), based on average price reported for all transactions during the month, January 2017-December 2020



Note: The 553 grade refers to a maximum level of 0.5 percent for aluminum, 0.5 percent for iron, and 0.3 percent for calcium.

Source: USGS Mineral Industry Surveys, based on Platts Metals Week and USGS, https://www.usgs.gov/centers/nmic/mineral-industry-surveys#S retrieved January 5, 2021.

[3] "The prices published in these publications are based on sales of silicon metal on the spot market to the secondary aluminum industry, which produces aluminum alloys from scrap." Hearing transcript, p. 26 (Bowes).

There are no published price series data for chemical or polysilicon grade silicon metal, but purchasers in all sectors are able to reference the index that is based on sales to the aluminum purchasers.[4] The published price of silicon metal increased by over 40 percent between January 2017 and January 2018. The published price of silicon metal increased slightly from January 2018 to March 2018, but then decreased steadily from March 2018 to December 2019. The price index was below its January 2017 value during September 2019 through October 2020, but the price index increased above its January 2017 level in November and December 2020.

Purchasers were asked if they refer to or otherwise rely on any published price information when negotiating spot or contract prices. Most reported that they referred to or relied on published price data. Seven of 24 responding purchasers (5 of 20 metallurgical end users and 2 of 4 chemical end users) reported that they did not rely on this information, including chemical end users ***. Two of the firms that did not use this information provided explanations. ***. ***. Eight purchasers reported referring to or relying on published price information for their spot purchases and 14 for their contract purchases. Thirteen firms reported using Platts, others listed CRU, and one listed "Argus Media." Two chemical end users, ***, reported referring to or relying on published price information for their purchases. ***.[5] ***.

[4] *Silicon Metal From Australia, Brazil, Kazakhstan, and Norway*, 83 FR 16382, April 16, 2018, p. V-1.

[5] Peitioners claim that ***. Petitioners posthearing brief, responses to Commissioners' questions pp. 48-49.

Petitioners stated that both buyers and sellers use these publicly available prices as "benchmarks when negotiating prices for both spot and contract sales in all segments of the market, including primary aluminum and chemical users. In addition, these published prices are used as the basis for setting prices in contracts with formula pricing provisions."[6]

Respondents stated that "silicon metal prices are based on quality and are not pegged merely to the secondary grade price indices, like Platts or CRU."[7] Respondents claim that any correlation between price indexes for secondary aluminum and the price in the chemical market may be the result of the business cycle and trends in the global silicon market which influence prices in both these market rather than the impact of subject imports.[8] In addition, RS Silicon claims that it provided very little of the 553 grade silicon metal used in the Platts and CRU indexes and thus the producer from Bosnia and Herzegovina could have minimal effect on the indexes.[9] It further contends that since subject imports were lower in 2018 than in 2017, subject imports did not trigger the price decline in 2018.[10]

Contract vs spot sales

U.S. producers and importers reported selling most of their silicon metal under annual contracts (table V-2). *** and two of the four responding importers reported that their one-year contracts are indexed to the published price of silicon metal. ***.[11] U.S. producers did not allow prices to be renegotiated during their contracts and their contracts tended to fix either price or both price and quantity. Importers also did not allow price renegotiation during contracts, and their contracts tended to fix both price and quantity. Petitioners state that annual contracts are typically negotiated during the fourth quarter of the calendar year.[12] Petitioners state that sales in the secondary aluminum sector tend to be on a spot basis,[13] however, the share of their shipments reported to secondary

[6] Hearing transcript, p. 27 (Bowes).
[7] Hearing transcript, p. 123 (Heffner).
[8] Respondent RS Silicon posthearing brief, pp. 3-4.
[9] Hearing transcript, p. 170 (Heffner).
[10] Respondent PCC posthearing brief, p. 12.
[11] For the U.S. producers, ***.
[12] Hearing transcript, p. 27 (Gordon).
[13] Hearing transcript, p. 50 (Klett).

aluminum producers was *** percent in 2020, while only *** percent of their U.S. commercial shipments were spot sales. Most subject import shipments are sold in the secondary aluminum market (*** percent in 2020); these importers reported that only a small share of their imports were sold on the spot market (*** percent of their U.S. commercial shipments).

Table V-2
Silicon metal: U.S. producers' and importers' shares of U.S. commercial shipments by type of sale, 2020

Type of sale	U.S. producers	Importers
Long-term contracts	***	***
Annual contracts	***	***
Short-term contracts	***	***
Spot sales	***	***
Total	100.0	100.0

Source: Compiled from data submitted in response to Commission questionnaires.

Mr. Majumdar of WPNA, a chemical user, explained that both chemical purchasers and silicon metal producers benefit from one year contracts that guarantee a base quantity to the producer and provide the purchaser with security of supply.[14] Further, he stated that "the primary aim of high-investment producers is to produce chemical-grade products." When a batch does not meet the specification of the chemical users then the producers mainly sell to the secondary aluminum market.[15]

Purchase frequency

Most metallurgical end users reported purchasing relatively infrequently with 10 of 20 reporting purchasing annually, 5 purchasing monthly, 2 purchasing quarterly, and 1 purchasing weekly.[16] Chemical end users tend to purchase more frequently than metallurgical end users. Two of four responding chemical end users reported purchasing weekly, one purchased quarterly, and one reported "other".[17]

[14] Hearing transcript, p. 178 (Majumdar).
[15] Hearing transcript, p. 179 (Majumdar).
[16] Five metallurgical end users reported other purchase patterns, including purchasing as required, hedge purchases, semi-annual purchases and purchasing mostly annually but also purchasing as needed.
[17] The chemical end user reporting "other" ***.

Twenty of 24 responding purchasers reported that their purchasing frequency had not changed since 2018. Three of 20 metallurgical end users and 1 of 4 chemical end user reported changes in purchase frequency. Most purchasers (11 of 20 metallurgical end users and 3 of 4 chemical end users) contact 1 to 5 suppliers before making a purchase, but some contacted up to 15 suppliers.[18]

Sales terms and discounts

Most U.S. producers (2 of 3) and importers (5 of 5) typically quote prices on a delivered basis.[19] All three responding U.S. producers and all 11 responding importers reported no discount policy.

[18] Chemical end user ***.

[19] *** one importer reported selling on both a delivered and an f.o.b. basis.

Price leadership

Just over half of the responding (11 of 20 responding metallurgical end users and 2 of 4 responding chemical end users)[20] reported that there were price leaders in the silicon metal market. Eleven firms listed Globe[21] as a price leader and three listed MS Silicon as a price leader.[22] Globe was reported to be a price leader because it "controls almost 90 percent of silicon production in North America", it controls a large share of U.S. and global markets, and "other companies are cautious about price for fear of antidumping."[23] [24] One metallurgical purchaser (***) reported MS Silicon as reported a price leader because it typically had the best domestic price and "set the market tone." Two metallurgical end users reported Globe and MS Silicon were price leaders because they were the main U.S. producers and because as noted by *** "they signal intentions on price movements together and use litigation to influence price. They use the same rehearsed narratives in discussions and calls."

[20] The chemical end users reporting price leaders were ***.

[21] Most purchasers (9) listed Ferroglobe rather than Globe as the price leader, and one explicitly reported that Ferroglobe, the parent company of Globe, was the price leader.

[22] Two of these firms listed both Globe and MS Silicon as price leaders. One purchaser reported that there were various price leaders.

[23] ***.

[24] *** reported that "CRU Silicon Metal Market Outlook Report, October 2017 (pg. 3) states that Ferroglobe is expected to "…continue to wield substantial pricing power for some time" because '{n}ot only does the company account for most of the non-captive production capacity in North America, but it also controls a substantial share of the material potentially available for import into the USA.'" ***.

Price data

The Commission requested U.S. producers and importers to provide quarterly data for the total quantity and f.o.b. value of the following silicon metal products shipped to unrelated U.S. customers during 2018-20.

Product 1.-- Sold to primary aluminum producers; silicon metal less than 99.99% pure that contains a minimum of 98.5% silicon, a maximum of 1.00% iron, a maximum of 0.07% calcium, and no restriction of the aluminum content.

Product 2.-- Sold to secondary aluminum producers; silicon metal less than 99.99% pure that contains a minimum of 97.0% silicon, a maximum of 2.00% iron, a maximum of 0.4% calcium, and no restriction of the aluminum content.

Product 3.-- Sold to chemical and/or polysilicon manufacturers; silicon metal less than 99.99% pure that contains a minimum of 98.0% silicon, a maximum of 1.50% iron, a maximum of 0.2% calcium, and a maximum of 0.4% aluminum.

Three U.S. producers and four importers provided usable pricing data for sales of the requested products, although not all firms reported pricing for all products for all quarters.[25] Pricing data reported by these firms accounted for approximately *** percent of U.S. producers' commercial shipments of silicon metal and *** percent of total U.S. shipments (including both commercial shipments and transfers to related parties) of silicon metal, *** percent of U.S. shipments of subject imports from Bosnia and Herzegovina, *** percent for Iceland, *** percent for Kazakhstan, and *** percent for Malaysia in 2020.[26] As noted in Part II, there ***,[27] and there is no reported price data for product 3 from subject countries.

[25] Per-unit pricing data are calculated from total quantity and total value data provided by U.S. producers and importers. The precision and variation of these figures may be affected by rounding, limited quantities, and producer or importer estimates.

[26] Pricing coverage is based on U.S. shipments reported in questionnaires.

[27] ***.

Price data for products 1-3 are presented in tables V-3 to V-5 and figures V-3 to V-5. No nonsubject country prices were collected. Appendix E reports these price data excluding sales to distributors ***.[28] [29] [30] Respondents state that the price data for sales to distributors are not equivalent to price data for sales to end users and thus should not be used in the evaluation of subject import prices and underselling and overselling analysis.[31]

[28] ***. RS Silicon states that the price data reported by ***. In addition, distributors may not sell all their product to the secondary aluminum market. RS Silicon's posthearing brief, pp 11-12.

[29] RS Silicon states that the price data reported by *** is inaccurately low because it is below the ***. Therefor price data reported by *** should be disregarded and a more accurate estimate would show mixed underselling and overselling. RS Silicon further concludes that price data reported by *** is suspect and should be excluded from the price data. RS Silicon's posthearing brief, pp. 5-10.

[30] PCC reports that ***. In addition since these sales are mainly to distributors they are not at the same level of trade as other prices and should be excluded. PCC posthearing brief, Responses to the Commissioners questions, pp. 4-6.

[31] Hearing transcript pp. 160-162 (Sud).

Table V-3
Silicon metal: Weighted-average f.o.b. prices and quantities of domestic and imported product 1 and margins of underselling/(overselling), by quarter, 2018-20

Period	United States		Kazakhstan		
	Price (dollars per short ton contained silicon)	Quantity (short tons contained silicon)	Price (dollars per short ton contained silicon)	Quantity (short tons contained silicon)	Margin (percent)
2018: Jan.-Mar.	***	***	***	***	***
Apr.-June	***	***	***	***	***
July-Sept.	***	***	***	***	***
Oct.-Dec.	***	***	***	***	***
2019: Jan.-Mar.	***	***	***	***	***
Apr.-June	***	***	***	***	***
July-Sept.	***	***	***	***	***
Oct.-Dec.	***	***	***	***	***
2020: Jan.-Mar.	***	***	***	***	***
Apr.-June	***	***	***	***	***
July-Sept.	***	***	***	***	***
Oct.-Dec.	***	***	***	***	***

Note: Product 1: Sold to primary aluminum producers; silicon metal less than 99.99% pure that contains a minimum of 98.5% silicon, a maximum of 1.00% iron, a maximum of 0.07% calcium, and no restriction of the aluminum content.

Source: Compiled from data submitted in response to Commission questionnaires.

Table V-4
Silicon metal: Weighted-average f.o.b. prices and quantities of domestic and imported product 2 and margins of underselling/(overselling), by quarter, 2018-20

Period	United States		Bosnia and Herzegovina			Iceland		
	Price (dollars per short ton contained silicon)	Quantity (short tons contained silicon)	Price (dollars per short ton contained silicon)	Quantity (short tons contained silicon)	Margin (percent)	Price (dollars per short ton contained silicon)	Quantity (short tons contained silicon)	Margin (percent)
2018:								
Jan.-Mar.	***	***	***	***	***	***	***	***
Apr.-June	***	***	***	***	***	***	***	***
July-Sept.	***	***	***	***	***	***	***	***
Oct.-Dec.	***	***	***	***	***	***	***	***
2019:								
Jan.-Mar.	***	***	***	***	***	***	***	***
Apr.-June	***	***	***	***	***	***	***	***
July-Sept.	***	***	***	***	***	***	***	***
Oct.-Dec.	***	***	***	***	***	***	***	***
2020:								
Jan.-Mar.	***	***	***	***	***	***	***	***
Apr.-June	***	***	***	***	***	***	***	***
July-Sept.	***	***	***	***	***	***	***	***
Oct.-Dec.	***	***	***	***	***	***	***	***

Period	Kazakhstan			Malaysia		
	Price (dollars per short ton contained silicon)	Quantity (short tons contained silicon)	Margin (percent)	Price (dollars per short ton contained silicon)	Quantity (short tons contained silicon)	Margin (percent)
2018:						
Jan.-Mar.	***	***	***	***	***	***
Apr.-June	***	***	***	***	***	***
July-Sept.	***	***	***	***	***	***
Oct.-Dec.	***	***	***	***	***	***
2019:						
Jan.-Mar.	***	***	***	***	***	***
Apr.-June	***	***	***	***	***	***
July-Sept.	***	***	***	***	***	***
Oct.-Dec.	***	***	***	***	***	***
2020:						
Jan.-Mar.	***	***	***	***	***	***
Apr.-June	***	***	***	***	***	***
July-Sept.	***	***	***	***	***	***
Oct.-Dec.	***	***	***	***	***	***

Note: Product 2: Sold to secondary aluminum producers; silicon metal less than 99.99% pure that contains a minimum of 97.0% silicon, a maximum of 2.00% iron, a maximum of 0.4% calcium, and no restriction of the aluminum content.

Table V-5
Silicon metal: Weighted-average f.o.b. prices and quantities of domestic and imported product 3 and margins of underselling/(overselling), by quarter, 2018-20

Period	United States	
	Price (dollars per short ton contained silicon)	Quantity (short tons contained silicon)
2018: Jan.-Mar.	***	***
Apr.-June	***	***
July-Sept.	***	***
Oct.-Dec.	***	***
2019: Jan.-Mar.	***	***
Apr.-June	***	***
July-Sept.	***	***
Oct.-Dec.	***	***
2020: Jan.-Mar.	***	***
Apr.-June	***	***
July-Sept.	***	***
Oct.-Dec.	***	***

Note: Product 3: Sold to chemical and/or polysilicon manufacturers; silicon metal less than 99.99% pure that contains a minimum of 98.0% silicon, a maximum of 1.50% iron, a maximum of 0.2% calcium, and a maximum of 0.4% aluminum..

Source: Compiled from data submitted in response to Commission questionnaires.

Figure V-3
Silicon metal: Weighted-average prices and quantities of domestic and imported product 1, by quarter, 2018-20

* * * * * * *

Product 1: Sold to primary aluminum producers; silicon metal less than 99.99% pure that contains a minimum of 98.5% silicon, a maximum of 1.00% iron, a maximum of 0.07% calcium, and no restriction of the aluminum content.

Source: Compiled from data submitted in response to Commission questionnaires.

Figure V-4
Silicon metal: Weighted-average prices and quantities of domestic and imported product 2, by quarter, 2018-20

* * * * * * *

Product 2: Sold to secondary aluminum producers; silicon metal less than 99.99% pure that contains a minimum of 97.0% silicon, a maximum of 2.00% iron, a maximum of 0.4% calcium, and no restriction of the aluminum content.

Source: Compiled from data submitted in response to Commission questionnaires.

Figure V-5
Silicon metal: Weighted-average prices and quantities of domestic and imported product 3, by quarter, 2018-20

* * * * * * *

Product 3: Sold to chemical and/or polysilicon manufacturers; silicon metal less than 99.99% pure that contains a minimum of 98.0% silicon, a maximum of 1.50% iron, a maximum of 0.2% calcium, and a maximum of 0.4% aluminum.

Source: Compiled from data submitted in response to Commission questionnaires.

Price trends

In general, prices decreased during 2018-20. Table V-6 summarizes the price trends, by country and by product. As shown in the table, domestic price decreases ranged from *** percent during 2018-20 while the import price for product 2 produced in Bosnia and Herzegovina the decrease was *** percent and the Kazakhstan product 2 decrease was *** percent. Figures V-6 and V-7 show the index of domestic and imported pricing products 1 through 3 where available. The decreases for product sold to secondary aluminum end users (product 2) was greater than decrease in the published silicon metal index of 25.7 percent (figure V-2), while the decrease in the price of product sold to primary aluminum and chemical and/or polysilicon manufacturers (products 1 and 3) were less than the published index.

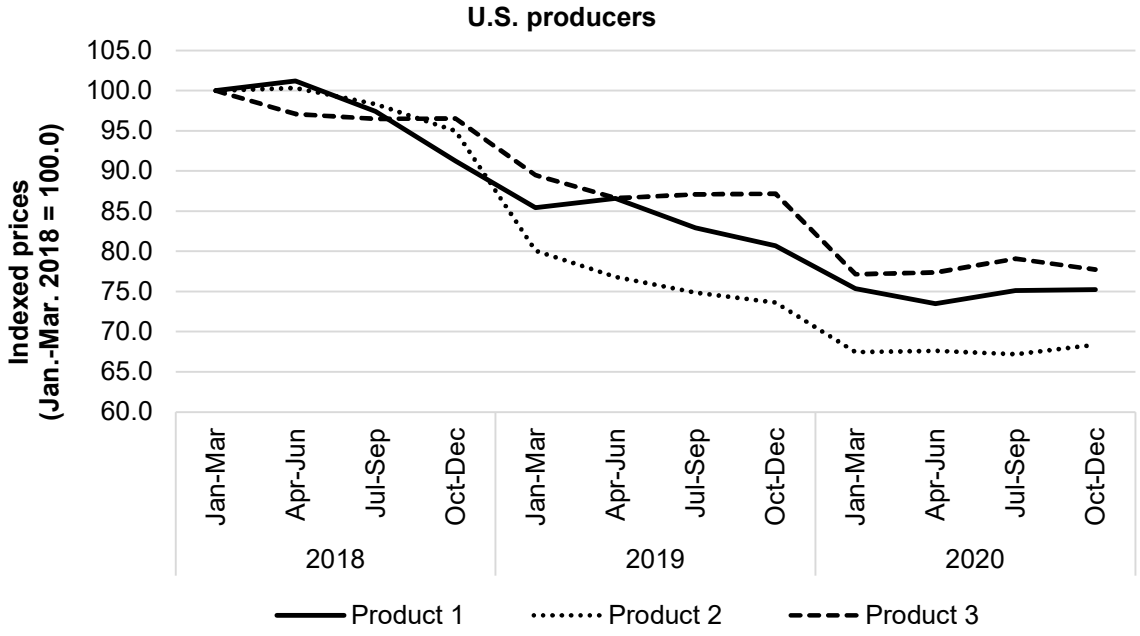
Table V-6
Silicon metal: Summary of weighted-average f.o.b. prices for products 1-3 from the United States and Bosnia and Herzegovina, Iceland, Kazakhstan, and Malaysia

Item	Number of quarters	Low price (per short ton contained silicon)	High price (per short ton contained silicon)	Change in price (percent)
Product 1:				
United States	***	***	***	***
Kazakhstan	***	***	***	***
Product 2:				
United States	***	***	***	***
Bosnia and Herzegovina	***	***	***	***
Iceland	***	***	***	***
Kazakhstan	***	***	***	***
Malaysia	***	***	***	***
Product 3:				
United States	12	***	***	***

Note: Percentage change from the first quarter of 2018 to the fourth quarter in 2020. Only countries for which prices were available are listed in this table. The price for product 2 from Iceland decreased ***.

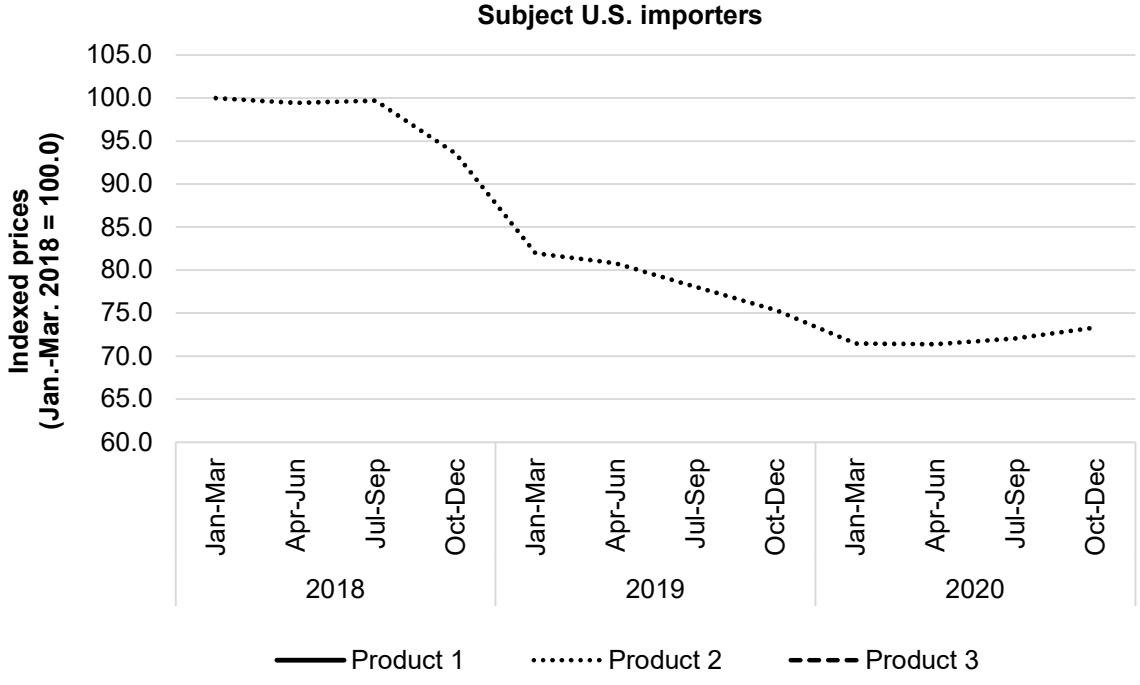
Source: Compiled from data submitted in response to Commission questionnaires.

Figure V-6
Silicon metal: Indexed U.S. producer prices, 2018-20



Source: Compiled from data submitted in response to Commission questionnaires.

Figure V-7
Silicon metal: Indexed subject U.S. importer combined prices of product 2, 2018-20



Source: Compiled from data submitted in response to Commission questionnaires.

Price comparisons

As shown in table V-7, subject imports undersold U.S. product in 41 of the 43 instances, (*** short tons of contained silicon) and oversold U.S. product in the remaining 2 instances (*** short tons of contained silicon). Prices for product imported from Bosnia and Herzegovina were below those for U.S.-produced product in all 12 instances (*** short tons contained silicon); margins of underselling ranged from *** percent. Prices for product imported from Iceland were below those for U.S.-produced product in all 10 instances (*** short tons contained silicon); margins of underselling ranged from *** percent. Prices for product imported from Kazakhstan were below those for U.S.-produced product in 12 of 14 instances (*** short tons contained silicon); margins of underselling ranged from *** percent. In the remaining 2 instances (*** short tons contained silicon), prices for product from Kazakhstan were between *** percent above prices for the domestic product. Prices for product imported from Malaysia were below those for U.S.-produced silicon metal in all 7 instances (*** short tons contained silicon); margins of underselling ranged from *** percent.

Table V-7
Silicon metal: Instances of underselling/overselling and the range and average of margins, by country, 2018-20

Source	Underselling				
	Number of quarters	Quantity (short tons contained silicon)	Average margin (percent)	Margin range (percent)	
				Min	Max
Product 1	---	---	---	---	---
Product 2	41	***	***	***	***
Total, underselling	41	***	***	***	***
Bosnia and Herzegovina	12	***	***	***	***
Iceland	10	***	***	***	***
Kazakhstan	12	***	***	***	***
Malaysia	7	***	***	***	***
Total, underselling	41	***	***	***	***
Source	**(Overselling)**				
	Number of quarters	Quantity (short tons contained silicon)	Average margin (percent)	Margin range (percent)	
				Min	Max
Product 1	2	***	***	***	***
Product 2	---	---	---	---	---
Total, overselling	2	***	***	***	***
Bosnia and Herzegovina	---	---	---	---	---
Iceland	---	---	---	---	---
Kazakhstan	2	***	***	***	***
Malaysia	---	---	---	---	---
Total, overselling	2	***	***	***	***

Note: These data include only quarters in which there is a comparison between the U.S. and subject product. Product 3 is not shown in the table since there were no import price data.

Source: Compiled from data submitted in response to Commission questionnaires.

Lost sales and lost revenue

In the preliminary phase of these investigations, the Commission requested that U.S. producers of silicon metal report purchasers with which they experienced instances of lost sales or revenue due to competition from imports of silicon metal from subject countries during January 2017 to March 2020. Two U.S. producers submitted lost sales and lost revenue allegations. The two responding U.S. producers identified 24 firms with which they lost sales or revenue (eight consisting lost sales allegations, seven consisting of lost revenue allegations, and nine consisting of both types of allegations). The producers were unable to specify the countries in most allegations. “Malaysia and other suppliers” were reported in one allegation. Allegations were reported for all three full years and 2020.

In the final phase of the investigation, of the three responding U.S. producers, two (***) reported that they had to either reduce prices or roll back announced price increases, and two firms (***) reported that they had lost sales.[32]

Staff contacted 52 purchasers and received responses from 24 purchasers. Responding purchasers reported purchasing 767,349 short tons contained silicon of silicon metal during 2018-20 (table V-8).

[32] ***.

Table V-8
Silicon metal: Purchasers' reported purchases and imports, 2018-20

Purchaser	Purchaser's end use	Purchases 2018-20 (short tons contained silicon)			Change in domestic share (pp, 2018-20)	Change in subject country share (pp, 2018-20)
		Domestic	Subject	All other		
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
Purchasers: Metallurgical end uses		72,837	33,927	61,504	(13.4)	5.6
Purchasers: Chemical end uses		325,512	---	273,569	(8.2)	---
Purchasers: All end uses		398,349	33,927	335,073	(8.9)	0.5

Note: All other includes all other sources and unknown sources.
Note: Percentage points (pp) change: Change in the share of the firm's total purchases of domestic and/or subject country imports between 2018 and 2020.

Source: Compiled from data submitted in response to Commission questionnaires.

Of the 20 responding metallurgical end users, 15 reported that, since 2018, they had purchased or imported silicon metal from subject countries instead of U.S.-produced product (10 from Bosnia and Herzegovina, 9 from Iceland, 7 from Kazakhstan, and 7 from Malaysia). No chemical end users reported purchasing from subject countries.

Ten of these purchasers reported that subject import prices were lower than those of U.S.-produced silicon metal, and eight[33] of these purchasers reported that price was a primary reason for the decision to purchase imported product rather than U.S.-produced product (three for Bosnia and Herzegovina, four for Iceland, six for Kazakhstan, and four for Malaysia). Seven of these purchasers estimated the quantity of silicon metal from subject countries purchased instead of domestic product; quantities ranged from *** short tons contained silicon to *** short tons contained silicon (table V-9). Table V-10 provides totals by country.

Seven purchasers also identified non-price reasons for purchasing imported rather than U.S.-produced product. Four purchasers bought imports for non-price reasons. One purchaser reported that the source of the silicon metal it purchased was determined by its long-term supplier. Another stated that it purchased imports in order to qualify another source (but the price of the imported silicon metal was not lower than the U.S. price). The third needed a second supplier ***. The fourth reported that the prices of imports were not lower than the U.S. prices but it purchased imports based on the terms and supply chain solutions offered.

[33] This includes *** which did not respond either yes or no in response to the question if price was a primary reason for purchasing silicon metal from subject countries, but reported price was lower and reported purchasing *** short tons of silicon metal from ***.

Table V-9
Silicon metal: Purchasers' responses to purchasing subject imports instead of domestic product

Purchaser	Purchaser's end use	Purchased subject imports instead of domestic	Imports priced lower	If purchased imports instead of domestic, was price a primary reason		
				Yes/ no	Quantity purchased instead of domestic (short tons contained silicon)	If No, non-price reason
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***

Table continued on next page.

Table V-9--Continued
Silicon metal: Purchasers' responses to purchasing subject imports instead of domestic product

Purchaser	Purchasers end use market	Purchased subject imports instead of domestic	Imports priced lower	If purchased imports instead of domestic, was price a primary reason		
				Yes/ no	Quantity purchased instead of domestic (short tons contained silicon)	If No, non-price reason
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
***	***	***	***	***	***	***
Purchasers: Metallurgical end uses		Yes--15; No--4	Yes--10; No--3	Yes--7; No--4	***	
Purchasers: Chemical end uses		Yes--0; No--4	Yes--0; No--0	Yes--0; No--0	***	
Purchasers: All end uses		Yes--15; No--8	Yes--10; No--3	Yes--7; No--4	***	

Note: NR is no response.
Note: ***.
Note: ***.

Source: Compiled from data submitted in response to Commission questionnaires.

Table V-10
Silicon metal: Purchasers' responses to purchasing subject imports instead of domestic product by country (only metallurgical end users reported purchasing subject imports)

Source	Count of purchasers reporting subject instead of domestic	Count of purchasers reported that imports were priced lower	Count of purchasers reporting that price was a primary reason for shift	Quantity subject purchased (short tons contained silicon)
Bosnia and Herzegovina	10	6	3	***
Iceland	9	7	4	***
Kazakhstan	7	7	6	***
Malaysia	7	5	4	***
Any subject source	15	10	8	***

Note: ***

Source: Compiled from data submitted in response to Commission questionnaires.

Of the 21 responding purchasers, 2 (both metallurgical end users) reported that U.S. producers had reduced prices in order to compete with lower-priced imports from subject countries; 7 purchasers (5 of 7 metallurgical and both responding chemical end users) reported that U.S. producers had not reduced prices to compete with lower-priced subject imports (table V-11).[34] One firm estimated the price reduction to be ***. The other firm reporting price reductions by U.S. producers in order to compete with lower-priced imports from subject countries reported that ***.

[34] Three purchasers did not answer the question and 13 purchasers (11 metallurgical and 2 chemical end users) reported that they did not know.

Table V-11
Silicon metal: Purchasers’ responses to U.S. producer price reductions

Purchaser	Purchasers end use market	U.S. producers reduced priced to compete with subject imports	If U.S. producers reduced prices	
			Estimated U.S. price reduction (percent)	Additional information, if available
***	***	***	***	***
***	***	***	***	***
***	***	***	***	***
***	***	***	***	***
***	***	***	***	***
***	***	***	***	***
***	***	***	***	***
***	***	***	***	***
***	***	***	***	***
***	***	***	***	***
***	***	***	***	***
***	***	***	***	***
***	***	***	***	***
***	***	***	***	***
***	***	***	***	***
***	***	***	***	***
***	***	***	***	***
***	***	***	***	***
***	***	***	***	***
***	***	***	***	***
***	***	***	***	***
***	***	***	***	***
***	***	***	***	***
***	***	***	***	***

Table continued on next page.

Table V-11--Continued
Silicon metal: Purchasers' responses to U.S. producer price reductions

Purchaser	Purchasers end use market	U.S. producers reduced priced to compete with subject imports	If U.S. producers reduced prices	
			Estimated U.S. price reduction (percent)	Additional information, if available
Purchasers: Metallurgical end uses		Yes--2; No—5	***	
Purchasers: Chemical end uses		Yes—0; No—2		
Purchasers: All end uses		Yes--2; No—7	***	

Note: NR is no response. DK is don't know.
Note: If purchasers reported yes for any source, their response is recorded as yes, if they did not report yes for any source but reported no for any source, their response is recorded as no. No firms responded yes for some sources and no for others.

Source: Compiled from data submitted in response to Commission questionnaires.

Table V-12
Silicon metal: Purchasers' responses (for metallurgical and chemical end users) to purchasing subject imports instead of domestic product by country

	Count of purchasers (metallurgical end users) reporting U.S. producers reduced prices	Count of purchasers (metallurgical end users) reporting U.S. producers did not reduce prices	Estimated U.S. price reduction metallurgical end users) (percent)	Count of purchasers (chemical end users) reporting U.S. producers reduced prices	Count of purchasers (chemical end users) reporting U.S. producers did not reduce prices
Bosnia and Herzegovina	1	5	---	0	2
Iceland	2	4	1.0	0	2
Kazakhstan	2	4	1.5	0	2
Malaysia	1	5	---	0	2
Any subject source	2	4		0	2

Note: Only one purchaser estimated overall price reductions by country.

Source: Compiled from data submitted in response to Commission questionnaires.

In responding to the lost sales/lost revenue survey, some purchasers provided additional information on purchases and market dynamics. ***. ***. ***. ***. ***.

Part VI: Financial experience of U.S. producers

Background

Three firms, DC Alabama, Globe, and MS Silicon, reported financial results on their U.S. silicon metal operations.[1] [2] During the three year period (full-year 2018 through 2020), *** accounted for *** percent of total silicon metal sales quantity, *** accounted for *** percent, and *** accounted for *** percent.

Events/activity impacting the silicon metal operations of U.S. producers include ***.[3]

Operations on silicon metal

Income-and-loss data for the U.S. producers' overall operations on silicon metal and corresponding changes in average per short ton values are presented in table VI-1 and table VI-2. Selected company-specific financial information is presented in table VI-3.[4] U.S. producers' financial results on open market operations are presented in Appendix G.

[1] All three U.S. producers reported their silicon metal financial results on a GAAP basis and for calendar-year periods.

[2] The silicon metal operations of Globe are part of parent company Ferroglobe's Electrometallurgy—North America segment. Ferroglobe 2019 20-F, p. 70. Dow Silicones, which owns/operates DC Alabama, is part of Dow's Performance Materials & Coatings segment. Dow 2019 10-K, p. 29 and p. 38. MS Silicon is a privately-held company.

[3] *** U.S. producer questionnaires, responses to II-2. *** U.S. producer questionnaire, response to III-10.

[4] As shown in tables VI-1 and VI-2, the U.S. industry's calculated average per short ton costs changed notably during the period, primarily reflecting ***. Because these changes reduce its utility, a variance analysis is not presented in this section of the report. *** a variance analysis is presented in Appendix G.

Table VI-1
Silicon metal: Results of overall operations of U.S. producers, 2018-20

Item	Calendar year		
	2018	2019	2020
	Quantity (short tons contained silicon)		
Commercial sales	***	***	***
Transfers to related firms	***	***	***
Total net sales quantity	***	***	***
	Value (1,000 dollars)		
Commercial sales	***	***	***
Transfers to related firms	***	***	***
Total net sales value	***	***	***
Cost of goods sold.-- Raw materials	***	***	***
Electricity	***	***	***
Direct labor	***	***	***
Other factory costs	***	***	***
Less: byproduct revenue	***	***	***
Total COGS	***	***	***
Gross profit or (loss)	***	***	***
SG&A expense	***	***	***
Operating income or (loss)	***	***	***
Interest expense	***	***	***
Other expenses	***	***	***
Other income items	***	***	***
Net income or (loss)	***	***	***
Depreciation/amortization	***	***	***
Estimated cash flow from operations	***	***	***
	Ratio to net sales (percent)		
Cost of goods sold.-- Raw materials	***	***	***
Electricity	***	***	***
Direct labor	***	***	***
Other factory costs	***	***	***
Less: byproduct revenue	***	***	***
Average COGS	***	***	***
Gross profit or (loss)	***	***	***
SG&A expense	***	***	***
Operating income or (loss)	***	***	***
Net income or (loss)	***	***	***

Table continued on next page.

Table VI-1--Continued
Silicon metal: Results of overall operations of U.S. producers, 2018-20

Item	Calendar year		
	2018	2019	2020
	Ratio to total COGS (percent)		
Cost of goods sold before byproduct offset--			
Raw materials	***	***	***
Electricity	***	***	***
Direct labor	***	***	***
Other factory costs	***	***	***
Average COGS	***	***	***
	Unit value (dollars per short tons contained silicon)		
Commercial sales	***	***	***
Transfers to related firms	***	***	***
Total net sales	***	***	***
Cost of goods sold.--			
Raw materials	***	***	***
Electricity	***	***	***
Direct labor	***	***	***
Other factory costs	***	***	***
Less: byproduct revenue	***	***	***
Average COGS	***	***	***
Gross profit or (loss)	***	***	***
SG&A expense	***	***	***
Operating income or (loss)	***	***	***
Net income or (loss)	***	***	***
	Number of firms reporting		
Operating losses	***	***	***
Net losses	***	***	***
Data	***	***	***

Note.--***. USITC auditor prehearing notes. See note to table VI-3 for corresponding *** pro forma financial results.

Source: Compiled from data submitted in response to Commission questionnaires.

Table VI-2
Silicon metal: Changes in AUVs (overall operations), between calendar years 2018-20

Item	Between calendar years		
	2018-20	2018-19	2019-20
	Change in AUVs (percent)		
Commercial sales	***	***	***
Transfers to related firms	***	***	***
Total net sales	***	***	***
Cost of goods sold.-- Raw materials	***	***	***
Electricity	***	***	***
Direct labor	***	***	***
Other factory costs	***	***	***
Less: byproduct revenue	***	***	***
Average COGS	***	***	***
	Change in AUVs (dollars per short tons contained silicon)		
Commercial sales	***	***	***
Transfers to related firms	***	***	***
Total net sales	***	***	***
Cost of goods sold.-- Raw materials	***	***	***
Electricity	***	***	***
Direct labor	***	***	***
Other factory costs	***	***	***
Less: byproduct revenue	***	***	***
Average COGS	***	***	***
Gross profit or (loss)	***	***	***
SG&A expense	***	***	***
Operating income or (loss)	***	***	***
Net income or (loss)	***	***	***

Source: Compiled from data submitted in response to Commission questionnaires.

Table VI-3
Silicon metal: Results of overall operations of U.S. producers, by firm, 2018-20

Item	Calendar year		
	2018	2019	2020
	Total net sales (short tons contained silicon)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	Total net sales (1,000 dollars)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	Cost of goods sold (1,000 dollars)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	Gross profit or (loss) (1,000 dollars)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	SG&A expenses (1,000 dollars)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	Operating income or (loss) (1,000 dollars)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	Net income or (loss) (1,000 dollars)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	COGS to net sales ratio (percent)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***

Table continued on next page.

Table VI-3--Continued
Silicon metal: Results of oveall operations of U.S. producers, by firm, 2018-20

Item	Calendar year		
	2018	2019	2020
	SG&A expense to net sales ratio (percent)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	Operating income or (loss) to net sales ratio (percent)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	Net income or (loss) to net sales ratio (percent)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	Unit net sales value (dollars per short tons contained silicon)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	Unit raw materials (dollars per short tons contained silicon)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	Unit electricity cost (dollars per short tons contained silicon)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	Unit direct labor (dollars per short tons contained silicon)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	Unit other factory costs (dollars per short tons contained silicon)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***

Table continued on next page.

Table VI-3--Continued
Silicon metal: Results of overall operations of U.S. producers, by firm, 2018-20

Item	Calendar year		
	2018	2019	2020
	Unit COGS (dollars per short tons contained silicon)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	Unit gross profit or (loss) (dollars per short tons contained silicon)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	Unit SG&A expenses (dollars per short tons contained silicon)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	Unit operating income or (loss) (dollars per short tons contained silicon)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	Unit net income or (loss) (dollars per short tons contained silicon)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***

Note.--***. USITC auditor prehearing notes. See note to table VI-1 for corresponding U.S. industry pro forma financial results.

Source: Compiled from data submitted in response to Commission questionnaires.

Net sales

For the period as a whole, *** represent the majority of reported silicon metal sales on a quantity and value basis (*** percent and *** percent, respectively). ***, which were reported primarily by *** and ***, represent the remainder (*** percent and *** percent, respectively).[5]

Sales quantity

While the U.S. industry's total silicon metal sales quantity declined in both 2019 and 2020, U.S. producers reported different company-specific directional patterns. *** reported an increase in total sales quanitity in 2019 followed by a decline in 2020, reflecting the ***. In contrast, *** reported reported a decline in total sales quantity in 2019 and then an increase in 2020. *** reported modest increases in total sales throughout the period.[6] [7]

[5] ***. Submission (Response to staff follow-up questions) by Counsel for Petitioners on behalf of ***, January 20, 2021.

[6] ***. Submission (Response to staff follow-up questions) by Counsel for Petitioners on behalf of ***, January 20, 2021.

[7] ***. Submission (Response to staff follow-up questions) by Counsel for Petitioners on behalf of ***, January 19, 2021.

Value

The U.S. industry's total sales value declined in 2019 and 2020, reflecting the impact of declining average per short ton sales values and lower sales quantities. While directional changes in sales quantity were mixed, *** U.S. producers reported declines in overall average per short ton sales value in 2019 and 2020.[8] ***, silicon metal sales values do not incorporate or reflect a direct passthrough of raw material or other primary input costs.[9]

With regard to the directional pattern of average sales value, ***.[10]

[8] When considering the subcategories of sales (i.e., commercial sales and transfer sales), the directional pattern of change in average per short ton sales values was not uniform. ***.

[9] ***. Submission (Response to staff follow-up questions) by Counsel for Petitioners on behalf of ***, January 20, 2021. ***. Submission (Response to staff follow-up questions) by Counsel for Petitioners on behalf of ***, January 19, 2021.

[10] ***. Ibid.

In general, Ferroglobe, Globe's parent company, attributed the decline in silicon metal prices in 2019 to "worseninng market conditions."[11]

Cost of goods sold and gross profit or loss

In terms of vertical integration, *** U.S. producer that reported input purchases from related suppliers.[12] In addition to facility restart and idling reported by ***, *** converted silicon metal production to ferrosilicon production during parts of the period. In 2019 and 2020, *** recognized ***.[13]

While a large share of silicon metal COGS represents variable costs, the inputs described below also include fixed costs, as well as costs that are mixed; i.e., reflecting both variable and fixed cost elements.[14] As noted below and in addition to changes in underlying input costs, changes in the mix of company-specific facilities producing silicon metal impacted average per short ton COGS.

Raw materials

Raw material cost is the largest component of silicon metal COGS, ranging from *** percent of COGS (prior to byproduct deduction) (2020) to *** percent (2018). Note: The

[11] Ferroglobe 2019 20-F, p. 70. Ferroglobe also noted that market supply and demand dynamics are important factors affecting the pattern of silicon metal pricing specifically. Ferroglobe 2019 20-F, p. 62.

[12] ***. *** U.S. producer questionnaire, response to III-7a. ***. Submission (Response to staff follow-up questions) by Counsel for Petitioners on behalf of ***, January 20, 2021.

[13] *** U.S. producer questionnaire, responses to II-2 and III-10.

[14] ***. Submission (Response to staff follow-up questions) by Counsel for Petitioners on behalf of ***, January 20, 2021.

relatively low raw material cost share in 2020 primarily reflects the impact of ***.

Primary raw material inputs include quartz, carbonaceous reductants (e.g., coal, charcoal, petroleum coke), bulking agents, electrodes, and other material inputs. For most of these items, U.S. producers reported similar cost shares.[15] As noted previously, *** is the *** U.S. producer that reported input purchases from related suppliers. ***.[16]

[15] On a company-specific basis and as a share of 2020 raw material cost, the following ranges were reported: quartz *** percent (***) to *** percent (***), carbonaceous reductants *** percent (***) to *** percent (***), bulking agents *** percent (***) to *** percent (***), electrodes *** percent (***) to *** percent (***). *** U.S. producer questionnaires, responses to III-9d.

[16] Submission (Response to staff follow-up questions) by Counsel for Petitioners on behalf of ***, January 20, 2021. ***. Ibid.

While reflecting some variability, the average raw material costs reported by *** did not change substantially during the period.[17] [18] Among its raw material inputs, *** indicated that *** increased notably in 2018 due to ***.[19] *** average raw material cost, which was lowest on a company-specific basis throughout the period, increased somewhat in 2019 and then declined to its lowest level in 2020.

Electricity

As a share of total COGS, electricity cost ranged from *** percent of COGS (prior to byproduct deduction) (2020) to *** percent (2018).[20] Note: The relatively low electricity cost

[17] ***. Ibid.

[18] ***. Submission (Response to staff follow-up questions) by Counsel for Petitioners on behalf of ***, January 19, 2021.

[19] Ibid. *** U.S. producer questionnaire, response to IV-18.

[20] With regard to electricity costs in general and its U.S. operations, Ferroglobe's 2019 20-F states "In the United States, we attempt to enter into long-term electric supply contracts that value our ability to interrupt load to achieve reasonable rates. Our power supply contracts have, in the past, resulted in stable price structures. In West Virginia, we have a contract with Brookfield Renewable Power to provide, on average, 45% of our power needs, from a dedicated hydro-electric facility, through December 2021 at a fixed rate. Our power needs for the non-hydroelectric component of West Virginia, Ohio, and Alabama are primarily sourced through special contracts that provide competitive rates whereas a portion of the power is also priced at market rates. At our Niagara Falls, New York plant, we have been granted a public sector package including 18.4 megawatts and hydro power through to 2028 with the balance being procured from the market." Ferroglobe 2019 20-F, p. 63.

***. Submission (Response to staff follow-up questions) by Counsel for Petitioners on behalf of ***, January 19, 2021.

share in 2020 primarily reflects the impact of ***.

On a company-specific basis, the directional pattern of average per short ton electricity cost varied somewhat: *** average electricity cost fluctuated but not substantially, while *** average electricity cost declined throughout the period.[21] [22]

Direct labor and other factory costs

On an overall basis direct labor as a share of COGS ranged from (*** percent of COGS (prior to byproduct deduction) (2020) to *** percent (2018)). Other factory costs as a share of COGS (prior to byproduct deduction) ranged from *** percent (2018) and *** percent (2020). Note: In 2020, the cost shares of direct labor (relatively low) and other factory costs

[21] ***. Submission (Response to staff follow-up questions) by Counsel for Petitioners on behalf of ***, January 20, 2021.

[22] ***. Submission (Response to staff follow-up questions) by Counsel for Petitioners on behalf of ***, January 19, 2021.

(relatively high) primarily reflect the impact of ***.

Company-specific average per short ton direct labor cost fluctuated with *** reporting relatively modest changes.[23] ***.[24] The notably large increases in *** average other factory costs in 2019 and 2020, primarily reflect ***.[25] While also fluctuating somewhat, changes in *** average other factory costs were less notable: *** average other factory costs increased in 2019

[23] ***. Ibid.

[24] ***. Email submission by *** on behalf of ***, response to USITC staff questions, February 4, 2021.

[25] ***. Ibid. ***. Ibid.

and declined in 2020;[26] *** average other factory costs declined throughout the period.[27]

Byproducts

*** reported similar byproducts generated during the production of silicon metal (***).[28] [29] While fluctuating somewhat on an

[26] ***. Submission (Response to staff follow-up questions) by Counsel for Petitioners on behalf of ***, January 20, 2021. ***. Submission (Response to staff follow-up questions) by Counsel for Petitioners on behalf of ***, January 20, 2021.

[27] ***. Submission (Response to staff follow-up questions) by Counsel for Petitioners on behalf of ***, January 19, 2021.

[28] In general, the distinction between joint products, also called main products, and byproducts is largely dependent on the market value of the products in question and their contribution to overall revenue. As such, a product's designation as a byproduct or a main product can change over time given market conditions. For cost accounting purposes the market value of a byproduct is generally treated as a deduction to arrive at the cost of the main product. *Cost Accounting: Using a Cost Management Approach*, L. Gayle Rayburn, Irwin, 1993, pp. 258-259. Given differences in the way byproduct revenue can be recognized and in order to maintain consistency, the Commission's income statement format classified net byproduct revenue as a separate line item deduction to determine total COGS.

[29] ***. Submission (Response to staff follow-up questions) by Counsel for Petitioners on behalf of ***, January 19, 2021.

average per short ton basis, byproduct revenue for overall operations did not change substantially during the period.

Gross profit or loss

The U.S. industry transitioned from a gross profit in 2018 to gross losses of increasing magnitude in 2019 and in 2020. On a company-specific basis, *** reported gross profit in 2018 and gross losses in 2019, but diverged in 2020 with *** reporting a small gross profit and *** reporting an increase in its gross loss compared to 2019. ***, reporting a small gross profit in 2018, transitioned to ***. ***.

SG&A expenses and operating income or loss

On a company-specific basis, U.S. producers reported a range of SG&A expense ratios (total SG&A expenses divided by total sales) with ***, which reported ***, reporting the lowest SG&A expense ratios throughout the period.[30] ***, whose SG&A expense ratios were the highest on a company-specific basis throughout the period, reported its highest SG&A expense ratio in 2018, a decline in 2019, and a modest increase in 2020.[31] *** SG&A expense ratio also fluctuated, increasing to its highest level in 2019, but remained within a relatively narrow range during the period.

[30] ***. *** U.S. producer questionnaire, response to III-10.

[31] ***. Submission (Response to staff follow-up questions) by Counsel for Petitioners on behalf of ***, January 19, 2021.

Following the same directional pattern as gross results, the U.S. industry reported operating income in 2018 and transitioned to operating losses of increasing magnitude in 2019 and 2020. On a company-specific basis, *** reported *** of varying magnitude throughout the period.[32]

***. ***.[33]

[32] ***. Ibid.

[33] ***. *** U.S. producer questionnaire, response to III-9e. ***. *** U.S. producer questionnaires, response to III-9e. ***.

Interest expense, other expenses and income, and net income or loss

The trend of the U.S. industry's overall operating results and net results was directionally the same throughout the period with absolute amounts differing due to the presence of net interest expense and net other income and expenses.

*** both reported interest expense throughout the period with *** reporting somewhat higher levels in 2018 and 2019. ***.[34] *** reported other income amounts of similar magnitudes, while *** was the *** U.S. producer to report other expenses.[35] ***.

Capital expenditures and research and development expenses

Table VI-4 presents U.S. producers' capital expenditures and research and development (R&D) expenses related to their silicon metal operations and table VI-5 presents firm-specific narrative descriptions.

[34] Email submission by *** on behalf of ***, response to USITC staff questions, February 4, 2021.

[35] ***. *** U.S. producer questionnaire, response to III-10. ***. Email submission by *** on behalf of ***, response to USITC staff questions, February 4, 2021.

Table VI-4
Silicon metal: Total capital expenditures and research and development (R&D) expenses of U.S. producers, 2018-20

Item	Calendar year		
	2018	2019	2020
	Capital expenditures (1,000 dollars)		
All firms	***	***	***
	Research and development expenses (1,000 dollars)		
All firms	***	***	***

Source: Compiled from data submitted in response to Commission questionnaires.

Table VI-5
Silicon metal: Narrative descriptions of U.S. producers' capital expenditures and R&D expenses since January 1, 2018

Capital expenditures:	
Firm	**Narrative**
DC Alabama	***
Globe	***
MS Silicon	***
R&D expenses:	
DC Alabama	***
Globe	***
MS Silicon	***

Source: Compiled from data submitted in response to Commission questionnaires.

Assets and return on assets

Table VI-6 presents U.S. producers' total net assets and operating return on net assets related to operations on silicon metal.[36]

[36] With respect to a company's overall operations, staff notes that a total asset value (i.e., the bottom line value on the asset side of a company's balance sheet) reflects an aggregation of a number of current and non-current assets, which, in many instances, are not product specific. In at least some instances, allocation factors were presumably necessary to report total asset values specific to U.S. producers' silicon metal operations. The ability of U.S. producers to assign total asset values to discrete product lines affects the meaningfulness of operating return on net assets.

Table VI-6
Silicon metal: Total net assets and operating return on net assets of U.S. producers, 2018-20

Firm	Calendar year		
	2018	2019	2020
	Total net assets (1,000 dollars)		
All firms	***	***	***
	Operating return on assets (percent)		
All firms	***	***	***

Source: Compiled from data submitted in response to Commission questionnaires.

Capital and investment

The Commission requested the U.S. producers of silicon metal to describe any actual or potential negative effects on their return on investment or their growth, investment, ability to raise capital, existing development and production efforts (including efforts to develop a derivative or more advanced version of the product), or the scale of capital investments as a result of imports of silicon metal from Bosnia-Herzegovina, Iceland, Kazakhstan, and Malaysia. Table VI-7 tabulates the responses regarding actual negative effects on investment, growth, and development, as well as anticipated negative effects. Table VI-8 presents the narrative responses of U.S. producers regarding actual and anticipated negative effects on investment, growth, and development.

Table VI-7
Silicon metal: Negative effects of imports from subject sources on investment, growth, and development since January 1, 2018

Item	No	Yes
Negative effects on investment	***	***
Cancellation, postponement, or rejection of expansion projects		***
Denial or rejection of investment proposal		***
Reduction in the size of capital investments		***
Return on specific investments negatively impacted		***
Other		***
Negative effects on growth and development	***	***
Rejection of bank loans		***
Lowering of credit rating		***
Problem related to the issue of stocks or bonds		***
Ability to service debt		***
Other		***
Anticipated negative effects of imports	***	***

Note.--***.

Source: Compiled from data submitted in response to Commission questionnaires.

Table VI-8
Silicon metal: Narrative responses of U.S. producers regarding actual and anticipated negative effects of imports from subject sources on investment, growth, and development since January 1, 2018

Effects/Firm	Narrative
Negative impact on investment:	
Cancellation, postponement, or rejection of expansion projects	
***	***
***	***
Reduction in the size of capital investments	
***	***
***	***
Return on specific investments negatively impacted	
***	***
Other negative effects on investments	
***	***

Table continued on next page.

Table VI-8--Continued
Certain chassis: Narrative responses of U.S. producers regarding actual and anticipated negative effects of imports from subject sources on investment, growth, and development since January 1, 2018

Effects/Firm	Narrative
Negative impact on growth and development:	
Rejection of bank loans	
***	***
Lowering of credit rating	
***	***
Problem related to the issue of stocks or bonds	
***	***
Ability to service debt	
***	***

Table continued on next page.

Table VI-8--Continued
Certain chassis: Narrative responses of U.S. producers regarding actual and anticipated negative effects of imports from subject sources on investment, growth, and development since January 1, 2018

Effects/Firm	Narrative
Negative impact on growth and development—continued:	
Ability to service debt—continued	
***	***
Other negative effects on growth and development	
***	***
Anticipated negative effects of imports:	
***	***
***	***

Source: Compiled from data submitted in response to Commission questionnaires.

Part VII: Threat considerations and information on nonsubject countries

Section 771(7)(F)(i) of the Act (19 U.S.C. § 1677(7)(F)(i)) provides that—

> *In determining whether an industry in the United States is threatened with material injury by reason of imports (or sales for importation) of the subject merchandise, the Commission shall consider, among other relevant economic factors*[1]*--*
>
> *(I) if a countervailable subsidy is involved, such information as may be presented to it by the administering authority as to the nature of the subsidy (particularly as to whether the countervailable subsidy is a subsidy described in Article 3 or 6.1 of the Subsidies Agreement), and whether imports of the subject merchandise are likely to increase,*
>
> *(II) any existing unused production capacity or imminent, substantial increase in production capacity in the exporting country indicating the likelihood of substantially increased imports of the subject merchandise into the United States, taking into account the availability of other export markets to absorb any additional exports,*
>
> *(III) a significant rate of increase of the volume or market penetration of imports of the subject merchandise indicating the likelihood of substantially increased imports,*
>
> *(IV) whether imports of the subject merchandise are entering at prices that are likely to have a significant depressing or suppressing effect on domestic prices, and are likely to increase demand for further imports,*
>
> *(V) inventories of the subject merchandise,*

[1] Section 771(7)(F)(ii) of the Act (19 U.S.C. § 1677(7)(F)(ii)) provides that "The Commission shall consider {these factors} . . . as a whole in making a determination of whether further dumped or subsidized imports are imminent and whether material injury by reason of imports would occur unless an order is issued or a suspension agreement is accepted under this title. The presence or absence of any factor which the Commission is required to consider . . . shall not necessarily give decisive guidance with respect to the determination. Such a determination may not be made on the basis of mere conjecture or supposition."

(VI) the potential for product-shifting if production facilities in the foreign country, which can be used to produce the subject merchandise, are currently being used to produce other products,

(VII) in any investigation under this title which involves imports of both a raw agricultural product (within the meaning of paragraph (4)(E)(iv)) and any product processed from such raw agricultural product, the likelihood that there will be increased imports, by reason of product shifting, if there is an affirmative determination by the Commission under section 705(b)(1) or 735(b)(1) with respect to either the raw agricultural product or the processed agricultural product (but not both),

(VIII) the actual and potential negative effects on the existing development and production efforts of the domestic industry, including efforts to develop a derivative or more advanced version of the domestic like product, and

(IX) any other demonstrable adverse trends that indicate the probability that there is likely to be material injury by reason of imports (or sale for importation) of the subject merchandise (whether or not it is actually being imported at the time).[2]

Information on the nature of the subsidies was presented earlier in this report; information on the volume and pricing of imports of the subject merchandise is presented in *Parts IV* and *V*; and information on the effects of imports of the subject merchandise on U.S. producers' existing development and production efforts is presented in *Part VI*. Information on inventories of the subject merchandise; foreign producers' operations, including the potential for "product-shifting;" any other threat indicators, if applicable; and any dumping in third-country markets, follows. Also presented in this section of the report is information obtained for consideration by the Commission on nonsubject countries.

[2] Section 771(7)(F)(iii) of the Act (19 U.S.C. § 1677(7)(F)(iii)) further provides that, in antidumping investigations, ". . . the Commission shall consider whether dumping in the markets of foreign countries (as evidenced by dumping findings or antidumping remedies in other WTO member markets against the same class or kind of merchandise manufactured or exported by the same party as under investigation) suggests a threat of material injury to the domestic industry."

The industry in Bosnia and Herzegovina

The Commission issued foreign producers' or exporters' questionnaires to one firm believed to produce and/or export silicon metal from Bosnia and Herzegovina.[3] The Commission received a usable questionnaire response from one firm: R-S Silicon D.O.O. Mrkonjic Grad/B.S.I. D.O.O. Jajce ("RS Silicon").[4] This firm's exports to the United States accounted for approximately *** percent of U.S. imports of silicon metal from Bosnia and Herzegovina in 2020. According to estimates requested of the responding producer (RS Silicon), its production of silicon metal in Bosnia and Herzegovina reported in its questionnaire response accounts for *** production of silicon metal in Bosnia and Herzegovina in 2020.[5] Table VII- 1 presents information on the silicon metal operations of RS Silicon.

Table VII-1
Silicon metal: Summary data for RS Silicon, 2020

Firm	Production (short tons contained silicon)	Share of reported production (percent)	Exports to the United States (short tons contained silicon)	Share of reported exports to the United States (percent)	Total shipments (short tons contained silicon)	Share of firm's total shipments exported to the United States (percent)
R-S Silicon	***	***	***	***	***	***
All firms	***	***	***	***	***	***

Source: Compiled from data submitted in response to Commission questionnaires.

Changes in operations

RS Silicon reported *** since January 1, 2018.

[3] This firm was identified through a review of information submitted in the petition and contained in *** records.

[4] According to its website, RS Silicon has the capacity to produce 16,000 tons of silicon metal per year. https://rssilicon.com/about-us/.

[5] According to RS Silicon, ***. Email correspondence with ***, July 28, 2020.

Operations on silicon metal

Table VII-2 presents information on the silicon metal operations of RS Silicon for 2018-20, and projections for 2021 and 2022.

RS Silicon's capacity *** from 2018 and 2019, but was *** percent lower in 2020 than in 2019. The overall production from 2018 to 2020 decreased by *** percent, while capacity utilization also decreased by *** percentage points from 2018 to 2020. In addition, end-of-period inventories fluctuated, they increased *** percent from 2018 to 2019, but decreased by *** percent during 2018-20. Total home market shipments were *** during 2018-20.

Total shipments of silicon metal, based on quantity, for RS Silicon decreased by *** percent from 2018 to 2020. Exports of silicon metal to the United States decreased by *** percent during 2018-20. Exports of silicon metal to all other markets decreased by *** percent during 2018-20. As a share of total shipments, exports to the United States decreased by *** percentage points from 2018 to 2020. Exports to all other markets as a share of total shipments increased by *** percentage points from 2018 to 2020. Other export markets during 2020 identified by RS Silicon included ***.[6] [7] Approximately ***.

[6] RS Silicon foreign producer questionnaire response, section II-8.

[7] The primary export markets outside the United States during 2020 for RS Silicon, which include percentages of exports to each country, are ***. Email Message from *** February 25, 2021.

Table VII-2
Silicon metal: Data for RS Silicon, 2018-20, and projections for 2021 and 2022

Item	Actual experience			Projections	
	Calendar year				
	2018	2019	2020	2021	2022
	Quantity (short tons contained silicon)				
Capacity	***	***	***	***	***
Production	***	***	***	***	***
End-of-period inventories	***	***	***	***	***
Shipments:					
Home market shipments:					
Internal consumption/ transfers	***	***	***	***	***
Commercial home market shipments	***	***	***	***	***
Total home market shipments	***	***	***	***	***
Export shipments to:					
United States	***	***	***	***	***
All other markets	***	***	***	***	***
Total exports	***	***	***	***	***
Total shipments	***	***	***	***	***
	Ratios and shares (percent)				
Capacity utilization	***	***	***	***	***
Inventories/production	***	***	***	***	***
Inventories/total shipments	***	***	***	***	***
Share of shipments:					
Home market shipments:					
Internal consumption/ transfers	***	***	***	***	***
Commercial home market shipments	***	***	***	***	***
Total home market shipments	***	***	***	***	***
Export shipments to:					
United States	***	***	***	***	***
All other markets	***	***	***	***	***
Total exports	***	***	***	***	***
Total shipments	***	***	***	***	***

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent.

Source: Compiled from data submitted in response to Commission questionnaires.

Alternative products

RS Silicon reported ***. At the Commission's hearing, RS Silicon indicated that it cannot shift production because the only product mix, other than silicon metal is a byproduct of its silicon metal production process.[8] Table VII-3 presents data for RS Silicon's overall production and capacity during 2018-20.

[8] Hearing transcript, p. 181 (Ferrin).

Table VII-3
Silicon metal: Overall capacity and production on the same equipment as in-scope production by RS Silicon, 2018-20

Item	Calendar year		
	2018	2019	2020
	Quantity (short tons contained silicon)		
Overall capacity	***	***	***
Production: Silicon metal contained weight	***	***	***
Weight of other elements	***	***	***
Silicon metal total weight	***	***	***
Ferrosilicon	***	***	***
Other products	***	***	***
Out-of-scope production	***	***	***
Total production on same machinery	***	***	***
	Ratios and shares (percent)		
Overall capacity utilization	***	***	***
Share of production: Silicon metal contained weight	***	***	***
Weight of other elements	***	***	***
Silicon metal total weight	***	***	***
Ferrosilicon	***	***	***
Other products	***	***	***
Out-of-scope production	***	***	***
Total production on same machinery	***	***	***

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent.

Source: Compiled from data submitted in response to Commission questionnaires.

Exports

According to GTA, the leading export markets for silicon metal from Bosnia and Herzegovina are the United Kingdom, Italy, and Germany (table VII-4). Table VII-4 indicates no available data for exports of silicon metal to the United States during 2017-19. During 2019, the United Kingdom was the top export market for silicon metal, based on quantity, from Bosnia and Herzegovina, accounting for 34.7 percent, followed by Italy, accounting for 29.4 percent.

Table VII-4
Silicon metal: Bosnia and Herzegovina exports by destination market, 2017-19

Destination market	Calendar year		
	2017	2018	2019
	Quantity (short tons contained silicon)		
United States	---	---	---
United Kingdom	7,136	9,733	10,342
Italy	17,862	11,633	8,757
Germany	4,959	4,236	5,088
Slovakia	3,860	2,589	2,463
Slovenia	1,755	1,358	1,166
Czech Republic	240	506	877
Romania	965	480	397
France	212	---	318
All other destination markets	899	1,508	423
Total exports	37,888	32,044	29,831
	Value (1,000 dollars)		
United States	---	---	---
United Kingdom	14,528	21,690	17,959
Italy	31,212	25,854	15,793
Germany	8,595	9,347	9,005
Slovakia	6,984	5,656	4,310
Slovenia	3,316	2,874	2,211
Czech Republic	439	1,008	1,389
Romania	1,739	1,054	713
France	407	---	663
All other destination markets	1,542	3,342	723
Total exports	68,762	70,825	52,766

Table continued on next page.

Table VII-4--Continued
Silicon metal: Bosnia and Herzegovina exports by destination market, 2017-19

Destination market	Calendar year		
	2017	2018	2019
	Unit value (dollars per STCS)		
United States	---	---	---
United Kingdom	2,036	2,228	1,737
Italy	1,747	2,222	1,803
Germany	1,733	2,206	1,770
Slovakia	1,810	2,185	1,750
Slovenia	1,890	2,115	1,896
Czech Republic	1,827	1,995	1,583
Romania	1,802	2,194	1,795
France	1,922	---	2,086
All other destination markets	1,714	2,217	1,707
Total exports	1,815	2,210	1,769
	Share of quantity (percent)		
United States	---	---	---
United Kingdom	18.8	30.4	34.7
Italy	47.1	36.3	29.4
Germany	13.1	13.2	17.1
Slovakia	10.2	8.1	8.3
Slovenia	4.6	4.2	3.9
Czech Republic	0.6	1.6	2.9
Romania	2.5	1.5	1.3
France	0.6	---	1.1
All other destination markets	2.4	4.7	1.4
Total exports	100.0	100.0	100.0

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent. United States is shown at the top, all remaining top export destinations shown in descending order of 2019 data.

Source: Official exports statistics under HS subheading 2804.69 reported by UN comtrade in the Global Trade Atlas database, accessed February 1, 2021. GTA is currently not available for 2020.

The industry in Iceland

The Commission issued foreign producers' or exporters' questionnaires to one firm believed to produce and/or export silicon metal from Iceland.[9] The Commission received a usable questionnaire response from one firm: PCC BakkiSilicon hf ("PCC").[10] This firm's exports to the United States accounted for approximately *** percent of U.S. imports of silicon metal

[9] This firm was identified through a review of information submitted in the petition and contained in *** records.

[10] According to its website, PCC has the capacity to produce 32,000 metric tons (35,274 short tons) annually at its Husavik (island) state-of-the-art facility. http://www.pcc.is/.

from Iceland in 2020. According to estimates requested of the responding producer (PCC), its production of silicon metal in Iceland reported in its questionnaire response accounts for *** production of silicon metal in Iceland in 2020.[11] Table VII-5 presents information on the silicon metal operations of PCC.

Table VII-5
Silicon metal: Summary data for PCC, 2020

Firm	Production (short tons contained silicon)	Share of reported production (percent)	Exports to the United States (short tons contained silicon)	Share of reported exports to the United States (percent)	Total shipments (short tons contained silicon)	Share of firm's total shipments exported to the United States (percent)
PCC BakkiSilicon hf.	***	***	***	***	***	***
All firms	***	***	***	***	***	***

Source: Compiled from data submitted in response to Commission questionnaires.

Changes in operations

As presented in table VII-6 PCC reported *** operational and organizational changes since January 1, 2018. At the Commission's hearing, PCC indicated that its plant shutdown in mid-2020.[12]

[11] According to PCC's website, silicon metal production started in April 2018 at its Husavik (island) facility. http://www.pcc.is/.

[12] Hearing transcript, p. 155 (Kenkel).

Table VII-6
Silicon metal: PCCs' reported changes in operations, since January 1, 2018

Item / Firm	Reported changed in operations
Plant openings:	
***	***
Prolonged shutdowns or curtailments:	
***	***
Revised labor agreements:	
***	***

Source: Compiled from data submitted in response to Commission questionnaires.

Operations on silicon metal

Table VII-7 presents information on the silicon metal operations for PCC in Iceland during 2018-20, and projections for 2021 and 2022.

PCC's capacity decreased by *** percent during 2018-20. The overall production increased by *** percent during 2018-20. Capacity utilization increased by *** percentage points during 2018-20. During 2018-20, end-of-period inventories decreased from *** during 2018 to *** short tons during 2020. Internal consumption/transfers increased by *** percent from 2018 to 2020.[13]

Total shipments of silicon metal, based on quantity, for PCC increased from *** short tons in 2018 to *** short tons during 2019, but decreased to *** short tons during 2020. Total shipments of silicon metal, based on quantity, increased by *** percent during 2018-20. Exports of silicon metal to the United States increased from *** short tons during 2018 to *** short tons during 2019, but were lower during 2020 *** short tons during 2020. PCC's exports of silicon metal to the United States increased by *** percent during 2018-20. Exports of silicon metal to all other markets increased from *** short tons during 2018 to *** short tons during 2019, but were lower during 2020 to *** short tons. Exports to all other markets increased by *** percent during 2018-20. As a share of total shipments, exports to the United States accounted for *** percent during 2018 and *** percent during 2019, but decreased by *** percentage points in 2020 to *** percentage points. Exports to all other markets as a share of total shipments accounted for *** percent during 2018 and decreased by *** percentage points during 2019, but were *** percentage points higher during 2020 than in 2019. Other export markets during 2020 identified by PCC included ***.[14] PCC indicated that *** percent of its exports were to other markets (not including the U.S.) during 2020, and that the *** has

[13] Projections indicate that capacity ***, production is projected to ***, total shipments and export shipments are both projected to ***, and most other indicators ***.

[14] PCC foreign producer questionnaire response, section II-8.

been and continues to be its main sales market.[15] At the Commission's hearing, PCC indicted that it had decreased its capacity from 2019 to 2020.[16]

[15] PCC BakkiSilicon hf prehearing brief, p. 160.
[16] Hearing transcript, p. 164 (Kenkel).

Table VII-7
Silicon metal: Data for PCC, 2018-20, projections for 2021 and 2022

Item	Actual experience			Projections	
	Calendar year				
	2018	2019	2020	2021	2022
	Quantity (short tons contained silicon)				
Capacity	***	***	***	***	***
Production	***	***	***	***	***
End-of-period inventories	***	***	***	***	***
Shipments:					
Home market shipments:					
Internal consumption/ transfers	***	***	***	***	***
Commercial home market shipments	***	***	***	***	***
Total home market shipments	***	***	***	***	***
Export shipments to:					
United States	***	***	***	***	***
All other markets	***	***	***	***	***
Total exports	***	***	***	***	***
Total shipments	***	***	***	***	***
	Ratios and shares (percent)				
Capacity utilization	***	***	***	***	***
Inventories/production	***	***	***	***	***
Inventories/total shipments	***	***	***	***	***
Share of shipments:					
Home market shipments:					
Internal consumption/ transfers	***	***	***	***	***
Commercial home market shipments	***	***	***	***	***
Total home market shipments	***	***	***	***	***
Export shipments to:					
United States	***	***	***	***	***
All other markets	***	***	***	***	***
Total exports	***	***	***	***	***
Total shipments	***	***	***	***	***

Source: Compiled from data submitted in response to Commission questionnaires.

Alternative products

As shown in table VII-8, PCC ***.[17]

Table VII-8
Silicon metal: Overall capacity and production on the same equipment as in-scope production by PCC, 2018-20

Item	Calendar year		
	2018	2019	2020
	Quantity (short tons contained silicon)		
Overall capacity	***	***	***
Production:			
Silicon metal contained weight	***	***	***
Weight of other elements	***	***	***
Silicon metal total weight	***	***	***
Ferrosilicon	***	***	***
Other products	***	***	***
Out-of-scope production	***	***	***
Total production on same machinery	***	***	***
	Ratios and shares (percent)		
Overall capacity utilization	***	***	***
Share of production:			
Silicon metal contained weight	***	***	***
Weight of other elements	***	***	***
Silicon metal total weight	***	***	***
Ferrosilicon	***	***	***
Other products	***	***	***
Out-of-scope production	***	***	***
Total production on same machinery	***	***	***

Source: Compiled from data submitted in response to Commission questionnaires.

[17] In the preliminary phase investigations, PCC indicated ***." PCC's preliminary phase foreign producer questionnaire response, II-10, and PCC's final phase foreign producer questionnaire response, II-3a.

Exports

According to GTA, the leading export markets for silicon metal from Iceland are the Netherlands, United States, and Germany (table VII-9). During 2019, the United States was the second largest export market for silicon metal from Iceland, accounting for 18.9 percent, preceded by the Netherlands, accounting for 35.4 percent, and followed by Germany, accounting for 16.1 percent.

Table VII-9
Silicon metal: Iceland's exports by destination market, 2017-19

Destination market	Calendar year		
	2017	2018	2019
	Quantity (short tons contained silicon)		
United States	---	816	5,931
Netherlands	6,799	5,115	11,068
Germany	572	332	5,027
Norway	---	1,119	2,313
Poland	---	---	1,753
Switzerland	---	308	1,722
United Kingdom	---	---	1,406
Egypt	---	---	1,177
United Arab Emirates	---	---	523
All other destination markets	522	66	381
Total exports	7,893	7,756	31,302
	Value (1,000 dollars)		
United States	---	1,749	12,188
Netherlands	12,930	2,657	4,193
Germany	64	757	6,354
Norway	---	29	1,291
Poland	---	---	2,419
Switzerland	---	555	2,380
United Kingdom	---	---	1,712
Egypt	---	---	25
United Arab Emirates	---	---	11
All other destination markets	983	128	600
Total exports	13,977	5,875	31,174

Table continued on next page.

Table VII-9--Continued
Silicon metal: Iceland's exports by destination market, 2017-19

Destination market	Calendar year		
	2017	2018	2019
	Unit value (dollars per STCS)		
United States	---	2,143	2,055
Netherlands	1,902	519	379
Germany	111	2,281	1,264
Norway	---	26	558
Poland	---	---	1,380
Switzerland	---	1,803	1,382
United Kingdom	---	---	1,217
Egypt	---	---	22
United Arab Emirates	---	---	22
All other destination markets	1,884	1,934	1,575
Total exports	1,771	757	996
	Share of quantity (percent)		
United States	---	10.5	18.9
Netherlands	86.1	65.9	35.4
Germany	7.2	4.3	16.1
Norway	---	14.4	7.4
Poland	---	---	5.6
Switzerland	---	4.0	5.5
United Kingdom	---	---	4.5
Egypt	---	---	3.8
United Arab Emirates	---	---	1.7
All other destination markets	6.6	0.9	1.2
Total exports	100.0	100.0	100.0

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent. United States is shown at the top, all remaining top export destinations shown in descending order of 2019 data.

Source: Official exports statistics under HS subheading 2804.69 reported by UN comtrade in the Global Trade Atlas database, accessed February 1, 2021. GTA is currently not available for 2020.

The industry in Kazakhstan

The Commission issued foreign producers' or exporters' questionnaires to one firm believed to produce and/or export silicon metal from Kazakhstan.[18] [19] The Commission received

[18] This firm was identified through a review of information submitted in the petition and contained in *** records.

[19] In its written submission to the Commission, the Ministry of Trade and Integration of the Republic of Kazakhstan indicated that MK KazSilicon stopped silicon metal production on October 20, 2015, and that its final sales were sold domestically on July 19, 2016. *Conference opening statement, Ministry of Trade and Integration of the Republic of Kazakhstan*, p. 1.

a usable questionnaire response from one firm:[20] Tau-Ken Temir LLP ("Tau-Ken").[21] This firm's exports to the United States accounted for approximately *** percent of U.S. imports of silicon metal from Kazakhstan in 2020. According to estimates requested of the responding producer (Tau-Ken), its production of silicon metal in Kazakhstan reported in its questionnaire response accounts for *** production of silicon metal in Kazakhstan in 2020. Table VII-10 presents information on the silicon metal operations of Tau-Ken.

Table VII-10
Silicon metal: Summary data for Tau-Ken, 2020

Firm	Production (short tons contained silicon)	Share of reported production (percent)	Exports to the United States (short tons contained silicon)	Share of reported exports to the United States (percent)	Total shipments (short tons contained silicon)	Share of firm's total shipments exported to the United States (percent)
Tau-Ken	***	***	***	***	***	***
All firms	***	***	***	***	***	***

Source: Compiled from data submitted in response to Commission questionnaires.

Changes in operations

As presented in table VII-11 Tau-Ken reported *** operational and organizational changes since January 1, 2018. According to Tau-Ken's website, the company has suspended production at its silicon metal plant in early 2020.[22]

[20] The data presented for Tau-Ken were obtained during the preliminary phase investigations. Tau-Ken ***.

[21] According to its website, Tau-Ken has the capacity to produce 25,000 tons of metallurgical grade silicon metal annually and it has reached total production capacity. http://tks.kz/en/tau-ken-temir-silicon-plant-started-full-capacity-operation/.

[22] https://tks.kz/en/production/ accessed on March 11, 2020.

Table VII-11
Silicon metal: Tau-Ken's reported changes in operations, since January 1, 2018

Item / Firm	Reported changes in operations
Prolonged shutdowns or curtailments:	
***	***
Revised labor agreements:	
***	***

Note.—Tau-Ken indicated that its silicon metal production ***. Email message from *** July 21, 2020.

Source: Compiled from data submitted in response to Commission questionnaires.

Operations on silicon metal

Table VII-12 presents information on the silicon metal operations of Tau-Ken in Kazakhstan during 2018-20, and projections for 2021 and 2022. Tau-Ken's capacity, production, inventories, and nearly all shipments decreased to *** during 2020 due to ***.[23]

Other export markets during 2019 identified by Tau-Ken included ***.[24] [25] According to its website, Tau-Ken exports silicon metal to the United States, Russia, Germany, Denmark, Netherlands, Norway, and other countries.[26]

[23] Projections indicate that ***.

[24] Tau-Ken foreign producer questionnaire response, section II-8.

[25] The primary export markets outside the United States during 2019 for Tau-Ken, which include percentages of exports to each country, are ***. Email Message from *** July 21, 2020.

[26] http://tks.kz/en/tau-ken-temir-silicon-plant-started-full-capacity-operation/.

Table VII-12
Silicon metal: Data for Tau-Ken in Kazakhstan, 2018-20, and projections for 2021 and 2022

Item	Actual experience			Projections	
	Calendar year				
	2018	2019	2020	2021	2022
	Quantity (short tons contained silicon)				
Capacity	***	***	***	***	***
Production	***	***	***	***	***
End-of-period inventories	***	***	***	***	***
Shipments:					
Home market shipments:					
Internal consumption/ transfers	***	***	***	***	***
Commercial home market shipments	***	***	***	***	***
Total home market shipments	***	***	***	***	***
Export shipments to:					
United States	***	***	***	***	***
All other markets	***	***	***	***	***
Total exports	***	***	***	***	***
Total shipments	***	***	***	***	***
	Ratios and shares (percent)				
Capacity utilization	***	***	***	***	***
Inventories/production	***	***	***	***	***
Inventories/total shipments	***	***	***	***	***
Share of shipments:					
Home market shipments:					
Internal consumption/ transfers	***	***	***	***	***
Commercial home market shipments	***	***	***	***	***
Total home market shipments	***	***	***	***	***
Export shipments to:					
United States	***	***	***	***	***
All other markets	***	***	***	***	***
Total exports	***	***	***	***	***
Total shipments	***	***	***	***	***

Source: Compiled from data submitted in response to Commission questionnaires.

Alternative products

Tau-Ken reported ***.

Exports

According to GTA, the leading export markets for silicon metal from Kazakhstan are the United States, Netherlands, and Poland (table VII-13). During 2019, the United States was the top export market for silicon metal from Kazakhstan, accounting for 42.4 percent, followed by the Netherlands, accounting for 19.3 percent, and Poland, accounting for 16.7 percent.

Table VII-13
Silicon metal: Kazakhstan exports by destination market, 2017-19

Destination market	Calendar year		
	2017	2018	2019
	Quantity (short tons contained silicon)		
United States	5,512	1,676	6,041
Netherlands	7,023	6,043	2,746
Poland	207	2,034	2,378
United Kingdom	1,327	1,867	1,261
Germany	662	1,002	747
Spain	---	106	717
Estonia	---	---	255
Canada	---	44	65
Czech Republic	741	369	23
All other destination markets	834	334	23
Total exports	16,306	13,475	14,255
	Value (1,000 dollars)		
United States	9,452	3,303	10,504
Netherlands	12,039	11,382	3,468
Poland	340	3,847	2,971
United Kingdom	2,060	3,317	1,663
Germany	625	1,478	697
Spain	---	204	918
Estonia	---	---	377
Canada	---	97	123
Czech Republic	1,180	706	30
All other destination markets	1,468	588	28
Total exports	27,166	24,921	20,779

Table continued on next page.

Table VII-13—Continued
Silicon metal: Kazakhstan exports by destination market, 2017-19

Destination market	Calendar year		
	2017	2018	2019
	Unit value (dollars per STCS)		
United States	1,715	1,971	1,739
Netherlands	1,714	1,883	1,263
Poland	1,641	1,892	1,249
United Kingdom	1,552	1,776	1,318
Germany	944	1,475	932
Spain	---	1,930	1,282
Estonia	---	---	1,481
Canada	---	2,191	1,896
Czech Republic	1,594	1,911	1,283
All other destination markets	1,759	1,762	1,227
Total exports	1,666	1,850	1,458
	Share of quantity (percent)		
United States	33.8	12.4	42.4
Netherlands	43.1	44.8	19.3
Poland	1.3	15.1	16.7
United Kingdom	8.1	13.9	8.8
Germany	4.1	7.4	5.2
Spain	---	0.8	5.0
Estonia	---	---	1.8
Canada	---	0.3	0.5
Czech Republic	4.5	2.7	0.2
All other destination markets	5.1	2.5	0.2
Total exports	100.0	100.0	100.0

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent. United States is shown at the top, all remaining top export destinations shown in descending order of 2019 data. GTA data not available for 2020.

Source: Official exports statistics under HS subheading 2804.69 as reported by Customs Control Committee of the Ministry of Finance in the Global Trade Atlas database, accessed July 16, 2020.GTA data not available for 2020.

The industry in Malaysia

The Commission issued foreign producers' or exporters' questionnaires to one firm believed to produce and/or export silicon metal from Malaysia.[27] The Commission received a usable questionnaire response from one firm: PMB Silicon Sdn Bhd ("PMB").[28] This firm's

[27] This firm was identified through a review of information submitted in the petition and contained in *** records.

[28] According to its website, PMB intends to have 72,000 metric tons (79,366 short tons) of production capacity by the end of financial year 2020. http://www.pmbtechnology.com/pmbsilicon/.

exports to the United States accounted for *** percent of U.S. imports of silicon metal from Malaysia in 2020. According to estimates requested of the responding producer (PMB), its production of silicon metal in Malaysia reported in its questionnaire response accounts for *** production of silicon metal in Malaysia during 2020. Table VII-14 presents information on the silicon metal operations of PMB.

Table VII-14
Silicon metal: Summary data for PMB, 2020

Firm	Production (short tons contained silicon)	Share of reported production (percent)	Exports to the United States (short tons contained silicon)	Share of reported exports to the United States (percent)	Total shipments (short tons contained silicon)	Share of firm's total shipments exported to the United States (percent)
PMB Silicon Sdn Bhd	***	***	***	***	***	***
All firms	***	***	***	***	***	***

Source: Compiled from data submitted in response to Commission questionnaires.

Changes in operations

PMB reported *** operational and organizational changes since January 1, 2018.

Operations on silicon metal

Table VII-15 presents information on the silicon metal operations for PMB in Malaysia during 2018-20, and projections for 2020 and 2021.

At the Commission's hearing, PMB indicated that it had built its plant in Borneo next to a giant hydroelectric dam due to an increasing market in the region (Asia specific).[29] PMB's capacity increased from *** in 2018 to *** short tons in 2019, and was *** percent higher in 2020 than in 2019. The overall production increased from *** during 2018 to *** short tons of silicon metal during 2019, and was *** percent higher during 2020 than in 2019. Capacity utilization was *** during 2018 and *** percent during 2019, while it was *** percentage points higher in 2020 than during 2019. During 2018-20, end-of-period inventories increased from *** during 2017 to *** short tons during 2019, while end-of-period inventories decreased

[29] Hearing transcript, p. 239 (Sim).

by *** percent during 2020 than in 2019. Internal consumption/transfers were *** short tons during 2019 and were *** short tons during 2020.[30]

Total shipments of silicon metal, based on quantity, for PMB increased from *** during 2018 to *** short tons in 2019, and total shipments were higher by *** percent during 2020 than during 2019. Exports of silicon metal to the United States increased from *** during 2018 to *** short tons during 2019, and were *** percent higher during 2020 than in 2019. Exports of silicon metal to all other markets increased from *** during 2018 to *** short tons during 2019 and increased to *** short tons during 2020. As a share of total shipments, exports to the United States accounted for *** percent during 2019, but were lower by *** percentage points during 2020 than in 2019. Exports to all other markets as a share of total shipments accounted for *** percent during 2019, but were *** percentage points higher during 2020 than in 2019. Other export markets during 2020 identified by PMB included ***.[31] PMB further indicated that its exports of silicon metal during 2020 (including the United States) were as follows; ***.[32]

[30] Projections indicate that capacity and production ***, total shipments are projected to ***, while export shipments to the United States are projected to *** and most other indicators ***.

[31] PMB foreign producer questionnaire response, section II-8.

[32] Email message from ***, February 26, 2021.

Table VII-15
Silicon metal: Data for PMB, 2018-20, projections for 2021 and 2022

Item	Actual experience			Projections	
	Calendar year				
	2018	2019	2020	2021	2022
	Quantity (short tons contained silicon)				
Capacity	***	***	***	***	***
Production	***	***	***	***	***
End-of-period inventories	***	***	***	***	***
Shipments:					
Home market shipments:					
Internal consumption/ transfers	***	***	***	***	***
Commercial home market shipments	***	***	***	***	***
Total home market shipments	***	***	***	***	***
Export shipments to:					
United States	***	***	***	***	***
All other markets	***	***	***	***	***
Total exports	***	***	***	***	***
Total shipments	***	***	***	***	***
	Ratios and shares (percent)				
Capacity utilization	***	***	***	***	***
Inventories/production	***	***	***	***	***
Inventories/total shipments	***	***	***	***	***
Share of shipments:					
Home market shipments:					
Internal consumption/ transfers	***	***	***	***	***
Commercial home market shipments	***	***	***	***	***
Total home market shipments	***	***	***	***	***
Export shipments to:					
United States	***	***	***	***	***
All other markets	***	***	***	***	***
Total exports	***	***	***	***	***
Total shipments	***	***	***	***	***

Source: Compiled from data submitted in response to Commission questionnaires.

Alternative products

PMB reported ***.

Exports

According to GTA, the leading export markets for silicon metal from Malaysia are the United States, Poland, and Japan (table VII-16). During 2019, the United States was the top export market for silicon metal from Malaysia, accounting for 51.7 percent of exports, followed by Poland, accounting for 13.0 percent, and Japan, accounting for 12.3 percent.

Table VII-16
Silicon metal: Exports by destination market for Malaysia, 2017-19

Destination market	Calendar year		
	2017	2018	2019
	Quantity (short tons contained silicon)		
United States	---	0	5,040
Poland	---	---	1,270
Japan	19	1	1,201
Netherlands	---	---	754
Singapore	492	403	335
Slovenia	---	---	296
Spain	---	---	261
Germany	0	---	165
China	462	520	118
All other destination markets	748	742	304
All destination markets	1,721	1,665	9,745
	Value (1,000 dollars)		
United States	---	8	7,803
Poland	---	---	1,742
Japan	101	3	1,660
Netherlands	---	---	1,112
Singapore	3,803	4,027	5,736
Slovenia	---	---	443
Spain	---	---	425
Germany	6	---	272
China	4,996	5,955	889
All other destination markets	1,749	1,619	629
All destination markets	10,654	11,611	20,711

Table continued on next page.

Table VII-16--Continued
Silicon metal: Exports by destination market for Malaysia, 2017-19

Destination market	Calendar year		
	2017	2019	2020
	Unit value (dollars per STCS)		
United States	---	138,345	1,548
Poland	---	---	1,372
Japan	5,360	3,356	1,382
Netherlands	---	---	1,474
Singapore	7,726	10,005	17,109
Slovenia	---	---	1,497
Spain	---	---	1,631
Germany	55,094	---	1,645
China	10,824	11,456	7,501
All other destination markets	2,338	2,183	2,069
All destination markets	6,192	6,974	2,125
	Share of quantity (percent)		
United States	---	0.0	51.7
Poland	---	---	13.0
Japan	1.1	0.0	12.3
Netherlands	---	---	7.7
Singapore	28.6	24.2	3.4
Slovenia	---	---	3.0
Spain	---	---	2.7
Germany	0.0	---	1.7
China	26.8	31.2	1.2
All other destination markets	43.5	44.5	3.1
All destination markets	100.0	100.0	100.0

Note.--Data are presented for 2017 through 2019 due to data availability. Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent. United States is shown at the top, all remaining top export destinations shown in descending order of 2019 data.

Source: Official exports statistics under HS subheading 2804.69 as reported by Department of Statistics Malaysia in the Global Trade Atlas database, accessed July 16, 2020. GTA data for 2020 are currently unavailable.

Subject countries combined

Table VII-17 presents summary data on silicon metal operations of the reporting subject producers in the subject countries during 2018-20, and projections for 2021 and 2022. During 2018-20, total capacity and total production for the combined subject producers increased. End-of-period inventories for the combined subject producers fluctuated but increased during 2018-20. Exports to the United States fluctuated but increased during 2018-20. Exports to all other markets and total exports for the combined subject producers increased during 2018-20. Internal consumption/transfers, commercial home market shipments and total home market shipments all fluctuated but increased during 2018-20. Combined capacity utilization fluctuated

but decreased by *** percentage points during 2018-20. Export shipments to the United States as a share of total shipments increased during 2018-20. Exports to all other markets as a share of total shipments decreased during 2018-20. Total exports as a share of total shipments decreased during 2018-20.

Table VII-17
Silicon metal: Data on the industry in subject countries, 2018-20, and projections for 2021 and 2022

Item	Actual experience			Projections	
	Calendar year				
	2018	2019	2020	2021	2022
	Quantity (short tons contained silicon)				
Capacity	***	***	***	***	***
Production	***	***	***	***	***
End-of-period inventories	***	***	***	***	***
Shipments:					
Home market shipments:					
Internal consumption/ transfers	***	***	***	***	***
Commercial home market shipments	***	***	***	***	***
Total home market shipments	***	***	***	***	***
Export shipments to:					
United States	***	***	***	***	***
All other markets	***	***	***	***	***
Total exports	***	***	***	***	***
Total shipments	***	***	***	***	***
	Ratios and shares (percent)				
Capacity utilization	***	***	***	***	***
Inventories/production	***	***	***	***	***
Inventories/total shipments	***	***	***	***	***
Share of shipments:					
Home market shipments:					
Internal consumption/ transfers	***	***	***	***	***
Commercial home market shipments	***	***	***	***	***
Total home market shipments	***	***	***	***	***
Export shipments to:					
United States	***	***	***	***	***
All other markets	***	***	***	***	***
Total exports	***	***	***	***	***
Total shipments	***	***	***	***	***

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent.

Source: Compiled from data submitted in response to Commission questionnaires.

U.S. inventories of imported merchandise

Table VII-18 presents data on U.S. importers' reported inventories of silicon metal during 2018-20. Inventories of imports of silicon metal from Bosnia and Herzegovina decreased during 2018-20. Inventories of imports of silicon metal from Iceland increased during 2018-20. Inventories of imports of silicon metal from Kazakhstan decreased during 2018-20. Inventories of imports of silicon metal from Malaysia increased from *** during 2018 to *** short tons during 2020. Inventories of imports of silicon metal from the combined subject sources *** during 2018-20. Inventories of imports of silicon metal from nonsubject sources increased during 2018-20. Inventories of imports of silicon metal from all import sources increased during 2018-20.

Table VII-18
Silicon metal: U.S. importers' inventories, 2018-20

Item	Calendar year		
	2018	2019	2020
	Inventories (short tons contained silicon); Ratios (percent)		
Imports from Bosnia and Herzegovina: Inventories	***	***	***
Ratio to U.S. imports	***	***	***
Ratio to U.S. shipments of imports	***	***	***
Ratio to total shipments of imports	***	***	***
Imports from Iceland: Inventories	***	***	***
Ratio to U.S. imports	***	***	***
Ratio to U.S. shipments of imports	***	***	***
Ratio to total shipments of imports	***	***	***
Imports from Kazakhstan: Inventories	***	***	***
Ratio to U.S. imports	***	***	***
Ratio to U.S. shipments of imports	***	***	***
Ratio to total shipments of imports	***	***	***
Imports from Malaysia: Inventories	***	***	***
Ratio to U.S. imports	***	***	***
Ratio to U.S. shipments of imports	***	***	***
Ratio to total shipments of imports	***	***	***
Imports from subject sources: Inventories	***	***	***
Ratio to U.S. imports	***	***	***
Ratio to U.S. shipments of imports	***	***	***
Ratio to total shipments of imports	***	***	***
Imports from nonsubject sources: Inventories	***	***	***
Ratio to U.S. imports	***	***	***
Ratio to U.S. shipments of imports	***	***	***
Ratio to total shipments of imports	***	***	***
Imports from all import sources: Inventories	***	***	***
Ratio to U.S. imports	***	***	***
Ratio to U.S. shipments of imports	***	***	***
Ratio to total shipments of imports	***	***	***

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent.

Source: Compiled from data submitted in response to Commission questionnaires.

U.S. importers' outstanding orders

The Commission requested importers to indicate whether they imported or arranged for the importation of silicon metal from Bosnia and Herzegovina, Iceland, Kazakhstan, and

Malaysia after December 31, 2020. Arranged imports from Malaysia accounted for *** of total arranged imports from subject sources from January 2021 through December 2021. Nonsubject sources accounted for *** of total arranged imports during January 2021 through December 2021. Table VII-18 U.S. importers arranged imports from January 2021 through December 2021.

Table VII-18
Silicon metal: Arranged imports, January 2021 through December 2021

Item	Period				
	Jan-Mar 2021	Apr-Jun 2021	Jul-Sept 2021	Oct-Dec 2021	Total
	Quantity (short tons contained silicon)				
Arranged U.S. imports from.--					
Bosnia and Herzegovina	***	***	***	***	***
Iceland	***	***	***	***	***
Kazakhstan	***	***	***	***	***
Malaysia	***	***	***	***	***
Subject sources	***	***	***	***	***
All other sources	***	***	***	***	***
All import sources	***	***	***	***	***

Source: Compiled from data submitted in response to Commission questionnaires.

Antidumping or countervailing duty orders in third-country markets

There are no known current trade remedy actions on imports of silicon metal from any of the four subject countries in third-country markets. Bosnia and Herzegovina and Kazakhstan were subject countries in recent silicon metal antidumping and countervailing duty investigations in Canada and the European Union, but no duties were issued in either case.[33]

[33] Canadian International Trade Tribunal, *Tribunal Initiates Injury—Silicon Metal from Brazil, Kazakhstan, Laos, Malaysia, Norway, Russia, and Thailand*, https://www.canada.ca/en/international-trade-tribunal/news/2017/02/tribunal_initiatesinquirysiliconmetalfrombrazilkazakhstanlaosmal.html, February 21, 2017.; Canadian International Trade Tribunal, *Silicon Metal,* Preliminary Injury Inquiry No. PI-2016-004, https://decisions.citt-tcce.gc.ca/citt-tcce/a/en/item/354761/index.do?q=silicon+metal+from+from+Brazil%2C+Kazakhstan%2C+Laos%2C+Malaysia%2C+Norway%2C+Russia%2C+and+Thailand, July 19, 2017. ; Canada Border Services Agency, *Certain Silicon Metal – Notice of Final Decisions,* https://www.cbsa-asfc.gc.ca/sima-lmsi/i-e/sm22017/sm22017-nf-eng.html, October 3, 2017.; Government of Canada, News Release, "Tribunal Finds no Injury nor Threat of Injury – Silicon Metal from Brazil, Kazakhstan, Laos, Malaysia, Norway, and Thailand" https://www.canada.ca/en/international-trade-tribunal/news/2017/11/tribunal_finds_noinjurynorthreatofinjurysiliconmetalfrombrazilka.html, November 2, 2017.; European Commission, *Notice of initiation of an anti-dumping proceeding concerning imports of silicon originating in Bosnia and Herzegovina and in Brazil,* December 19, 2017,

(*continued*...)

Information on nonsubject countries

World Production

World production of silicon metal was estimated by the United States Geological Survey (USGS) to have been 3.33 million short tons in 2018,[34] excluding silicon metal produced in the United States.[35] CRU (a market research firm) estimated that world production of silicon metal was *** short tons in 2017, *** short tons in 2018, and *** short tons in 2019.[36] Table VII-19 presents silicon metal production by country. *** According to Roskill (a market research firm), global silicon metal capacity utilization was estimated at 51 percent in 2016, a marginal increase from that in recent years. Reportedly, the low utilization rate primarily reflected overcapacity and underutilization in China's silicon metal industry.[37] ***.[38] ***[39] ***[40]

https://op.europa.eu/en/publication-detail/-/publication/0c3549ad-e498-11e7-9749-01aa75ed71a1/language-en/format-PDF.

[34] This is the most recent year that the USGS published world production data for silicon.

[35] USGS, 2018 Minerals Yearbook, Silicon Chapter, Advance data release of the 2018 annual tables, https://prd-wret.s3.us-west-2.amazonaws.com/assets/palladium/production/atoms/files/myb1-2018-simet-adv.xlsx (accessed July 20, 2020).

[36] Petition, Appendix, Exhibit 1-15 p. 65.; Figures have been converted into short tons and rounded to second decimal so may not reflect exact amounts.

[37] *Outlook for silicon metal diverges sharply from that for ferrosilicon*, Roskill Information Services Ltd., https://roskill.com/news/outlook-silicon-metal-diverges-sharply-ferrosilicon/ (accessed July 20, 2020).

[38] Petition, Appendix, Exhibit 1-15 p. 62.

[39] Petition, Appendix, Exhibit 1-15 p. 66.

[40] Petition, Appendix, Exhibit 1-15, pp. 63-64.

Table VII-19
Silicon Metal: Global production, by country, 2015-2019

	2015	2016	2017	2018	2019
			(1,000 short tons)		
Canada	***	***	***	***	***
United States	***	***	***	***	***
North America	***	***	***	***	***
Brazil	***	***	***	***	***
Latin America	***	***	***	***	***
France	***	***	***	***	***
Germany	***	***	***	***	***
Spain	***	***	***	***	***
Slovakia	***	***	***	***	***
Iceland	***	***	***	***	***
Norway	***	***	***	***	***
Bosnia	***	***	***	***	***
Western Europe	***	***	***	***	***
South Africa	***	***	***	***	***
Africa/Middle East	***	***	***	***	***
Kazakhstan	***	***	***	***	***
Russia	***	***	***	***	***
CIS	***	***	***	***	***
China	***	***	***	***	***
North Korea	***	***	***	***	***
Bhutan	***	***	***	***	***
Laos	***	***	***	***	***
Malaysia	***	***	***	***	***
Philippines	***	***	***	***	***
Thailand	***	***	***	***	***
Asia	***	***	***	***	***
Australia	***	***	***	***	***
Oceania	***	***	***	***	***
Total World	***	***	***	***	***
Total excl. China	***	***	***	***	***

***.
***.

Global exports

Table VII-20 presents the leading exporting countries of silicon metal from 2017 to 2019. Total world exports decreased by 2.6 percent by quantity and 3.7 percent by value from 2017 to 2019. China accounted for the largest share of global exports by quantity in 2019 (46.4 percent), followed by Norway, (13.0 percent), Brazil (12.6 percent), Netherlands (9.3 percent), and Australia (2.8 percent). In 2019, Brazil, Canada, and Norway were the leading nonsubject exporters of silicon metal to the United States.

Table VII-20
Silicon metal: Global exports by exporter, 2017-19

Exporter	Calendar year		
	2017	2018	2019
	Quantity (short tons contained silicon)		
United States	5,780	5,350	2,434
Bosnia & Herzegovina	37,888	32,044	29,831
Iceland	7,893	7,756	31,302
Kazakhstan	16,306	13,475	14,255
Malaysia	1,721	1,665	9,745
Subject exporters	63,808	54,939	85,133
China	911,887	898,767	765,555
Norway	204,178	199,821	214,456
Brazil	171,331	212,057	208,426
Netherlands	136,336	139,656	152,666
Australia	51,398	45,747	46,621
South Africa	10,400	39,340	32,639
Canada	26,871	32,366	32,563
Germany	20,031	20,898	23,512
Russia	17,155	27,193	17,164
All other exporters	75,221	89,001	69,151
All reporting exporters	1,694,396	1,765,136	1,650,320
	Value (1,000 dollars)		
United States	9,253	8,638	3,752
Bosnia & Herzegovina	68,762	70,825	52,766
Iceland	13,977	5,875	31,174
Kazakhstan	27,166	24,921	20,779
Malaysia	10,654	11,611	20,711
Subject exporters	120,559	113,232	125,430
China	1,515,841	1,619,123	1,212,269
Norway	371,692	427,566	405,413
Brazil	343,766	477,410	435,423
Netherlands	249,270	292,987	296,796
Australia	92,988	102,716	92,601
South Africa	23,115	82,991	53,431
Canada	63,273	87,175	79,244
Germany	32,170	35,384	34,004
Russia	27,044	51,979	26,200
All other exporters	160,495	207,996	133,319
All reporting exporters	3,009,466	3,507,199	2,897,882

Table continued on next page.

Table VII-20—Continued
Silicon metal: Global exports by exporter, 2017-19

Exporter	Calendar year		
	2017	2018	2019
	Unit value (dollars per STCS)		
United States	1,601	1,615	1,542
Bosnia & Herzegovina	1,815	2,210	1,769
Iceland	1,771	757	996
Kazakhstan	1,666	1,850	1,458
Malaysia	6,192	6,974	2,125
Subject exporters	2,034	2,218	1,517
China	1,662	1,801	1,584
Norway	1,820	2,140	1,890
Brazil	2,006	2,251	2,089
Netherlands	1,828	2,098	1,944
Australia	1,809	2,245	1,986
South Africa	2,223	2,110	1,637
Canada	2,355	2,693	2,434
Germany	1,606	1,693	1,446
Russia	1,576	1,911	1,526
All other exporters	2,134	2,337	1,903
All reporting exporters	1,776	1,987	1,756
	Share of quantity (percent)		
United States	0.3	0.3	0.1
Bosnia & Herzegovina	2.2	1.8	1.8
Iceland	0.5	0.4	1.9
Kazakhstan	1.0	0.8	0.9
Malaysia	0.1	0.1	0.6
Subject exporters	3.8	3.1	5.2
China	53.8	50.9	46.5
Norway	12.1	11.3	13.0
Brazil	10.1	12.0	12.6
Netherlands	8.0	7.9	9.3
Australia	3.0	2.6	2.8
South Africa	0.6	2.2	2.0
Canada	1.6	1.8	2.0
Germany	1.2	1.2	1.4
Russia	1.0	1.5	1.0
All other exporters	4.4	5.0	4.0
All reporting exporters	100.0	100.0	100.0

Note.--Data are presented for 2017 through 2019 due to data availability. Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent. United States and subject countries are shown at the top, all remaining top exporters are shown in descending order of 2019 data.

Source: Official exports statistics under HS subheading 2804.69 reported by various national statistical authorities in the Global Trade Atlas database, accessed February 1, 2021.

The Industry in Brazil

Brazil was the largest nonsubject source of imports of silicon metal to the United States in 2019.[41] The United States was the second largest destination market for Brazilian silicon metal in 2020, followed by the United Kingdom, and Germany in both value and volume. Table VII-21 presents data on Brazil's top export markets for silicon metal from 2018 to 2020. During that time, the U.S. share of Brazil's exports, by quantity, increased by 8.3 percentage points, from 27.6 percent in 2018 to 27.6 percent in 2020.

Table VII-21
Silicon Metal: Brazil exports by destination market, 2018-20

Destination market	Calendar year		
	2018	2019	2020
	Quantity (short tons contained silicon)		
United States	40,933	62,989	55,051
United Kingdom	68,861	64,431	48,354
Germany	45,584	25,277	25,975
Japan	11,464	11,680	11,814
Canada	4,740	7,181	9,054
United Arab Emirates	---	11,023	8,591
Poland	3,277	3,478	8,284
Thailand	6,118	9,259	7,906
Netherlands	17,215	3,464	4,480
All other destination markets	13,866	9,644	19,643
Total exports	212,057	208,426	199,152
	Value (1,000 dollars)		
United States	100,258	139,354	106,543
United Kingdom	164,403	147,293	97,985
Germany	95,008	48,331	42,195
Japan	22,570	22,993	19,221
Canada	10,543	15,056	14,466
United Arab Emirates	---	17,044	12,777
Poland	7,193	4,935	12,826
Thailand	12,389	18,379	13,254
Netherlands	35,596	5,257	7,202
All other destination markets	29,450	16,782	30,224
Total exports	477,410	435,423	356,691

Table continued on next page.

[41] USITC Dataweb, HTS 2804.69.1000 and HTS 2804.69.5000, accessed July 22, 2020.

Table VII-21—Continued
Silicon Metal: Brazil exports by destination market, 2018-20

Destination market	Calendar year		
	2018	2019	2020
	Unit value (dollars per STCS)		
United States	2,449	2,212	1,935
United Kingdom	2,387	2,286	2,026
Germany	2,084	1,912	1,624
Japan	1,969	1,969	1,627
Canada	2,224	2,097	1,598
United Arab Emirates	---	1,546	1,487
Poland	2,195	1,419	1,548
Thailand	2,025	1,985	1,676
Netherlands	2,068	1,518	1,608
All other destination markets	2,124	1,210	2,180
Total exports	2,251	2,089	1,791
	Share of quantity (percent)		
United States	19.3	30.2	27.6
United Kingdom	32.5	30.9	24.3
Germany	21.5	12.1	13.0
Japan	5.4	5.6	5.9
Canada	2.2	3.4	4.5
United Arab Emirates	---	5.3	4.3
Poland	1.5	1.7	4.2
Thailand	2.9	4.4	4.0
Netherlands	8.1	1.7	2.2
All other destination markets	6.5	4.6	9.9
Total exports	100.0	100.0	100.0

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent. United States is shown at the top, all remaining top export destinations shown in descending order of 2019 data.

Source: Official exports statistics under HS subheading 2804.69 as reported by SECEX – Foreign Trade Secretariat in the Global Trade Atlas database, accessed March 1, 2021.

***[42] As of 2019, there were four silicon metal producers ***[43] in Brazil.[44] These firms are Palmyra do Brasil de Silício Metálico (formerly known as Dow Corning Silicio do Brasil), ***,[45] Ligas de Aluminio S.A. ("LIASA"), Rima Industrial S.A. ("RIMA") ***, and Companhia Ferroligas Minas Gerais ("Minasligas"). ***[46]

[42] ***.

[43] Petition, Appendix, Exhibit 1-15 p. 69.

[44] *Silicon Metal from Australia, Brazil, Kazakhstan, and Norway*, *Investigation Nos. 701-TA-567-569 and 731-TA-1343-1345 (Final)*, USITC Pub. 4773, April 2018, pp. VII-6-VII-7.

[45] Company has also been referred to as "Palmyra do Brasil de Silico Metálico" in certain publications.

[46] ***.

The Industry in Canada

Canada was the second largest nonsubject source of imports of silicon metal to the United States in 2019.[47] The United States was the largest destination market by quantity for Canadian silicon metal in 2020, accounting for nearly all of Canada's exports. Table VII-22 presents data on Canada's top export markets for silicon metal from 2018 to 2020. During that time, the U.S. share of Canada's exports, by quantity, increased by 4.4 percentage points, from 93.2 percent in 2018 to 95.7 percent in 2020.

Table VII-22
Silicon metal: Canadian exports by destination market, 2018-20

Destination market	Calendar year		
	2018	2019	2020
	Quantity (short tons contained silicon)		
United States	30,157	31,869	24,173
France	18	2	597
Germany	263	265	235
Brazil	226	269	126
India	56	---	93
China	140	157	64
Norway	---	---	5
Mexico	1	1	4
Israel	---	---	0
All other destination markets	1,505	---	---
Total exports	32,366	32,563	25,297
	Value (1,000 dollars)		
United States	82,782	78,525	51,495
France	21	3	821
Germany	181	218	171
Brazil	274	313	146
India	66	---	105
China	167	183	70
Norway	---	---	6
Mexico	1	2	4
Israel	---	---	0
All other destination markets	3,682	0	0
Total exports	87,175	79,244	52,819

Table continued on next page.

[47] USITC Dataweb, HTS 2804.69.1000 and HTS 2804.69.5000, accessed July 22, 2020.

Table VII-22—Continued
Silicon metal: Canadian exports by destination market, 2018-20

Destination market	Calendar year		
	2018	2019	2020
	Unit value (dollars per STCS)		
United States	2,745	2,464	2,130
France	1,184	1,165	1,375
Germany	688	826	726
Brazil	1,210	1,163	1,163
India	1,189	---	1,122
China	1,196	1,165	1,097
Norway	---	---	1,180
Mexico	1,183	1,160	1,162
Israel	---	---	1,107
All other destination markets	2,447	1,167	1,149
Total exports	2,693	2,434	2,088
	Share of quantity (percent)		
United States	93.2	97.9	95.6
France	0.1	0.0	2.4
Germany	0.8	0.8	0.9
Brazil	0.7	0.8	0.5
India	0.2	---	0.4
China	0.4	0.5	0.3
Norway	---	---	0.0
Mexico	0.0	0.0	0.0
Israel	---	---	0.0
All other destination markets	4.6	---	---
Total exports	100.0	100.0	100.0

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent. United States is shown at the top, all remaining top export destinations shown in descending order of 2019 data.
Source: Official exports statistics under HS subheading 2804.69 as reported by Statistics Canada in the Global Trade Atlas database, accessed March 1, 2021.

There is only one silicon metal producer in Canada, Quebec Silicon Limited Partnership ("QSLP"), owned jointly by GSM and Dow Corning, which operates a silicon metal plant in Bécancour, Québec.[48] ***.[49] ***[50] Between August and September 2019, two furnaces were idled at the QSLP plant and they remained in that state as of July 2020. These idlings were part

[48] *Silicon Metal from Australia, Brazil, Kazakhstan, and Norway*, *Investigation Nos. 701-TA-567-569 and 731-TA-1343-1345 (Final)*, USITC Pub. 4773, April 2018, p. VII-32.
[49] ***.
[50] ***.

of more widescale curtailments of silicon and ferrosilicon production made by parent company Ferroglobe in response to market conditions.[51]

[51] *Ferroglobe Provides Corporate Update*, Ferroglobe press release, October 4 ,2019, https://investor.ferroglobe.com/news-releases/news-release-details/ferroglobe-provides-corporate-update, retrieved on July 23, 2020.

APPENDIX A

FEDERAL REGISTER NOTICES

The Commission makes available notices relevant to its investigations and reviews on its website, www.usitc.gov. In addition, the following tabulation presents, in chronological order, *Federal Register* notices issued by the Commission and Commerce during the current proceeding.

Citation	Title	Link
85 FR 41063, July 8, 2020	*Silicon Metal from Bosnia and Herzegovina, Iceland, Kazakhstan, and Malaysia; Institution of Anti-Dumping and Countervailing Duty Investigations and Scheduling of Preliminary Phase Investigations*	https://www.govinfo.gov/content/pkg/FR-2020-07-08/pdf/2020-14625.pdf
85 FR 45177, July 27, 2020	*Silicon Metal from Bosnia and Herzegovina, Iceland, and Malaysia: Initiation of Less-Than-Fair-Value Investigations*	https://www.govinfo.gov/content/pkg/FR-2020-07-27/pdf/2020-16220.pdf
85 FR 45173, July 27, 2020	*Silicon Metal from the Republic of Kazakhstan: Initiation of Countervailing Duty Investigation*	https://www.govinfo.gov/content/pkg/FR-2020-07-27/pdf/2020-16221.pdf
85 FR 51491, August 20, 2020	*Silicon Metal From Bosnia and Herzegovina, Iceland, Kazakhstan, and Malaysia*	https://www.govinfo.gov/content/pkg/FR-2020-08-20/pdf/2020-18210.pdf
85 FR 74319 November 20, 2020	*Silicon Metal From Malaysia: Postponement of Preliminary Determination in the Less-Than-Fair-Value Investigation*	https://www.govinfo.gov/content/pkg/FR-2020-11-20/pdf/2020-25635.pdf

Citation	Title	Link
85 FR 78122 (December 3, 2020)	*Silicon Metal From the Republic of Kazakhstan: Preliminary Affirmative Countervailing Duty Determination, and Alignment of Final Determination With Final Antidumping Duty Determination*	https://www.govinfo.gov/content/pkg/FR-2020-12-03/pdf/2020-26627.pdf
85 FR 86578 December 30, 2020	*Silicon Metal From Bosnia and Herzegovina, Iceland, Kazakhstan, and Malaysia; Scheduling of the Final Phase of Countervailing Duty and Anti-Dumping Duty Investigations*	https://www.govinfo.gov/content/pkg/FR-2020-12-30/pdf/2020-28818.pdf
85 FR 80009 December 11, 2020	*Silicon Metal From Bosnia and Herzegovina and Iceland: Preliminary Affirmative Determinations of Sales at Less Than Fair Value*	https://www.govinfo.gov/content/pkg/FR-2020-12-11/pdf/2020-27316.pdf
86 FR 7701 February 1, 2021	*Silicon Metal From Malaysia: Preliminary Affirmative Determination of Sales at Less Than Fair Value, Postponement of Final Determination, and Extension of Provisional Measures*	https://www.govinfo.gov/content/pkg/FR-2021-02-01/pdf/2021-02080.pdf
86 FR 11725, February 26, 2021	*Silicon Metal From the Republic of Kazakhstan: Final Affirmative Countervailing Duty Determination*	https://www.govinfo.gov/content/pkg/FR-2021-02-26/pdf/2021-04032.pdf

86 FR 11720, February 26, 2021	*Silicon Metal From Bosnia and Herzegovina and Iceland: Final Affirmative Determinations of Sales at Less Than Fair Value and Final Affirmative Determination of Critical Circumstances for Iceland*	https://www.govinfo.gov/content/pkg/FR-2021-02-26/pdf/2021-04003.pdf

APPENDIX B

LIST OF HEARING WITNESSES

CALENDAR OF PUBLIC HEARING

Those listed below appeared in the United States International Trade Commission's hearing via videoconference:

Subject:	Silicon Metal from Bosnia and Herzegovina, Iceland, Kazakhstan, and Malaysia
Inv. Nos.:	701-TA-652 and 731-TA-1524-1526 (Final)
Date and Time:	February 22, 2021 - 9:30 a.m.

OPENING REMARKS:

Petitioners (**Adam H. Gordon**, The Bristol Group PLLC)
Respondents (**John J. Kenkel**, deKieffer & Horgan, PLLC)

In Support of the Imposition of Antidumping and Countervailing Duty Orders:

The Bristol Group PLLC
Washington, DC
on behalf of

Globe Specialty Metals, Inc.
Mississippi Silicon LLC

Braulio Lage, Director, Mississippi Silicon LLC

Christopher Bowes, Sales Manager – North America,
Ferroglobe PLC, parent company, Globe Specialty Metals, Inc.

Daniel Klett, Principal, Capital Trade, Inc.

Adam H. Gordon)
Jennifer M. Smith) – OF COUNSEL
Lauren Fraid)

In Opposition to the Imposition of
Antidumping and Countervailing Duty Orders:

deKieffer & Horgan, PLLC
Washington, DC
on behalf of

PCC BakkiSilicon hf ("PCC")

Runar Sigurpallson, CEO, PCC

Rolf Prack, Director, Sales and Strategic Procurement, PCC

Edwin Antonius Vermulst, Attorney, VVGB Advocaten

Juhi Sud, Attorney, VVGB Advocaten

Antigoni Mathaiou, Attorney, VVGB Advocaten

John J. Kenkel) – OF COUNSEL

Faegre Drinker Biddle & Reath LLP
Washington, DC
on behalf of

R-S Silicon d.o.o. Mrkonjic Grad

Jelena Kuridža, Managing Director, R-S Silicon d.o.o. Mrkonjic Grad

Gianmichele Foglia, Silicon Metal Division Manager, Metalleghe S.p.A
and Procurator, R-S Silicon d.o.o. Mrkonjic Grad and B.S.I. d.o.o Jajce

Douglas J. Heffner)
) – OF COUNSEL
Richard P. Ferrin)

Trade Law Defense PLLC
Washington, DC
on behalf of

MTALX Limited ("MTALX")

Frank H. Morgan) – OF COUNSEL

In Opposition to the Imposition of
Antidumping and Countervailing Duty Orders (continued):

Appleton Luff
Washington, DC
on behalf of

PMB Silicon Sdn Bhd ("PMB")

Edmund W. Sim)
) – OF COUNSEL
Kelly A. Slater)

Wacker Polysilicon North America LLC
Wacker Chemical Corporation
Wacker Chemie AG
(collectively "WACKER")
München, Germany

Oliver Majumdar, Senior Manager, Global Trade Affairs, WACKER

REBUTTAL/CLOSING REMARKS:

Petitioners (**Adam H. Gordon**, The Bristol Group PLLC)
Respondents (**Richard P. Ferrin**, Faegre Drinker Biddle & Reath LLP; and **John J. Kenkel,** deKieffer & Horgan, PLLC)

-END-

APPENDIX C

SUMMARY DATA

Table C-1
Silicon metal: Summary data concerning the U.S. market, 2018-20
(Quantity=short tons contained silicon; Value=1,000 dollars; Unit values, unit labor costs, and unit expenses=dollars per STCS; Period changes=percent--exceptions noted)

	Reported data			Period changes		
	Calendar year			Comparison years		
	2018	2019	2020	2018-20	2018-19	2019-20
U.S. consumption quantity:						
Amount	***	***	***	▼***	▼***	▼***
Producers' share (fn1)	***	***	***	▼***	▼***	▲***
Importers' share (fn1):						
Bosnia and Herzegovina	***	***	***	▲***	▲***	▼***
Iceland	***	***	***	▲***	▲***	▼***
Kazakhstan	***	***	***	▼***	▲***	▼***
Malaysia	***	***	***	▲***	▲***	▲***
Subject sources	***	***	***	▲***	▲***	▼***
Nonsubject sources	***	***	***	▲***	▲***	▲***
All import sources	***	***	***	▲***	▲***	▼***
U.S. consumption value:						
Amount	***	***	***	▼***	▼***	▼***
Producers' share (fn1)	***	***	***	▼***	▼***	▲***
Importers' share (fn1):						
Bosnia and Herzegovina	***	***	***	▲***	▲***	▼***
Iceland	***	***	***	▲***	▲***	▼***
Kazakhstan	***	***	***	▼***	▲***	▼***
Malaysia	***	***	***	▲***	▲***	▲***
Subject sources	***	***	***	▲***	▲***	▼***
Nonsubject sources	***	***	***	▲***	▲***	▼***
All import sources	***	***	***	▲***	▲***	▼***
U.S. imports from:						
Bosnia and Herzegovina:						
Quantity	9,350	10,493	8,319	▼(11.0)	▲12.2	▼(20.7)
Value	21,653	20,079	14,562	▼(32.7)	▼(7.3)	▼(27.5)
Unit value	$2,316	$1,913	$1,751	▼(24.4)	▼(17.4)	▼(8.5)
Ending inventory quantity	***	***	***	▼***	▼***	▼***
Iceland:						
Quantity	1,259	6,947	4,986	▲296.0	▲451.7	▼(28.2)
Value	2,369	11,711	7,182	▲203.1	▲394.3	▼(38.7)
Unit value	$1,882	$1,686	$1,440	▼(23.5)	▼(10.4)	▼(14.6)
Ending inventory quantity	***	***	***	▲***	▲***	▼***
Kazakhstan:						
Quantity	3,045	8,522	1,219	▼(60.0)	▲179.9	▼(85.7)
Value	6,064	15,171	1,800	▼(70.3)	▲150.2	▼(88.1)
Unit value	$1,991	$1,780	$1,477	▼(25.8)	▼(10.6)	▼(17.0)
Ending inventory quantity	***	***	***	▼***	▲***	▼***

Table C-1--Continued
Silicon metal: Summary data concerning the U.S. market, 2018-20
(Quantity=short tons contained silicon; Value=1,000 dollars; Unit values, unit labor costs, and unit expenses=dollars per STCS; Period changes=percent--exceptions noted)

	Reported data			Period changes		
	Calendar year			Comparison years		
	2018	2019	2020	2018-20	2018-19	2019-20
U.S. imports from:--Continued						
Malaysia:						
Quantity	---	3,894	11,000	▲---	▲---	▲182.5
Value	---	6,595	16,912	▲---	▲---	▲156.5
Unit value	---	$1,693	$1,538	▲---	▲---	▼(9.2)
Ending inventory quantity	***	***	***	▲***	▲***	▲***
Subject sources:						
Quantity	13,654	29,857	25,523	▲86.9	▲118.7	▼(14.5)
Value	30,086	53,556	40,456	▲34.5	▲78.0	▼(24.5)
Unit value	$2,203	$1,794	$1,585	▼(28.1)	▼(18.6)	▼(11.6)
Ending inventory quantity	***	***	***	▲***	▲***	▲***
Nonsubject sources:						
Quantity	118,966	126,190	111,609	▼(6.2)	▲6.1	▼(11.6)
Value	315,333	301,596	230,038	▼(27.0)	▼(4.4)	▼(23.7)
Unit value	$2,651	$2,390	$2,061	▼(22.2)	▼(9.8)	▼(13.8)
Ending inventory quantity	***	***	***	▲***	▲***	▲***
All import sources:						
Quantity	132,620	156,047	137,133	▲3.4	▲17.7	▼(12.1)
Value	345,419	355,152	270,494	▼(21.7)	▲2.8	▼(23.8)
Unit value	$2,605	$2,276	$1,972	▼(24.3)	▼(12.6)	▼(13.3)
Ending inventory quantity	***	***	***	▲***	▲***	▲***
U.S. producers':						
Average capacity quantity	***	***	***	▼***	▼***	▼***
Production quantity	***	***	***	▼***	▼***	▼***
Capacity utilization (fn1)	***	***	***	▼***	▼***	▼***
U.S. shipments:						
Quantity	***	***	***	▼***	▼***	▼***
Value	***	***	***	▼***	▼***	▼***
Unit value	***	***	***	▼***	▼***	▼***
Export shipments:						
Quantity	***	***	***	▼***	▲***	▼***
Value	***	***	***	▼***	▼***	▼***
Unit value	***	***	***	▲***	▼***	▲***
Ending inventory quantity	***	***	***	▼***	▼***	▼***
Inventories/total shipments (fn1)	***	***	***	▼***	▼***	▼***
Production workers	***	***	***	▼***	▼***	▲***
Hours worked (1,000s)	***	***	***	▼***	▼***	▲***
Wages paid ($1,000)	***	***	***	▼***	▼***	▲***
Hourly wages (dollars per hour)	***	***	***	▲***	▲***	▲***
Productivity (STCS per 1,000 hours)	***	***	***	▼***	▲***	▼***
Unit labor costs	***	***	***	▲***	▲***	▲***

Table C-1--Continued
Silicon metal: Summary data concerning the U.S. market, 2018-20
(Quantity=short tons contained silicon; Value=1,000 dollars; Unit values, unit labor costs, and unit expenses=dollars per STCS; Period changes=percent--exceptions noted)

	Reported data			Period changes		
	Calendar year			Comparison years		
	2018	2019	2020	2018-20	2018-19	2019-20
U.S. producers':--Continued						
Net sales:						
Quantity	***	***	***	▼***	▼***	▼***
Value	***	***	***	▼***	▼***	▼***
Unit value	***	***	***	▼***	▼***	▼***
Cost of goods sold (COGS)	***	***	***	▼***	▼***	▲***
Gross profit or (loss) (fn2)	***	***	***	▼***	▼***	▼***
SG&A expenses	***	***	***	▼***	▼***	▼***
Operating income or (loss) (fn2)	***	***	***	▼***	▼***	▼***
Net income or (loss) (fn2)	***	***	***	▼***	▼***	▼***
Capital expenditures	***	***	***	▼***	▼***	▲***
Research and development expenses	***	***	***	***	***	***
Net assets	***	***	***	▼***	▼***	▼***
Unit COGS	***	***	***	▲***	▲***	▲***
Unit SG&A expenses	***	***	***	▼***	▼***	▲***
Unit operating income or (loss) (fn2)	***	***	***	▼***	▼***	▼***
Unit net income or (loss) (fn2)	***	***	***	▼***	▼***	▼***
COGS/sales (fn1)	***	***	***	▲***	▲***	▲***
Operating income or (loss)/sales (fn1)	***	***	***	▼***	▼***	▼***
Net income or (loss)/sales (fn1)	***	***	***	▼***	▼***	▼***

Note.--Shares and ratios shown as "0.0" percent represent non-zero values less than "0.05" percent (if positive) and greater than "(0.05)" percent (if negative). Zeroes, null values, and undefined calculations are suppressed and shown as "---". Period changes preceded by a "▲" represent an increase, while period changes preceded by a "▼" represent a decrease.

fn1.--Reported data are in percent and period changes are in percentage points.
fn2.--Percent changes only calculated when both comparison values represent profits; The directional change in profitability provided when one or both comparison values represent a loss.

Source: Compiled from data submitted in response to Commission questionnaires and official U.S. import statistics based on General Imports using HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed February 6, 2021.

APPENDIX D

U.S. SHIPMENTS TO END USERS

Table D-1
Silicon metal: U.S. producers' and U.S. importers; U.S. shipments to aluminum end users (both primary and secondary), 2018-20

Item	Calendar year		
	2018	2019	2020
	Quantity (short tons contained silicon)		
U.S. producers' U.S. shipments.--			
DC Alabama	***	***	***
Globe	***	***	***
MS silicon	***	***	***
All U.S. producers	***	***	***
U.S. importers' U.S. shipments from.--			
Bosnia and Herzegovina	***	***	***
Iceland	***	***	***
Kazakhstan	***	***	***
Malaysia	***	***	***
Subject sources	***	***	***
Nonsubject sources	***	***	***
All import sources	***	***	***
Combined producers and importers	***	***	***
	Value (1,000 dollars)		
U.S. producers' U.S. shipments.--			
DC Alabama	***	***	***
Globe	***	***	***
MS silicon	***	***	***
All U.S. producers	***	***	***
U.S. importers' U.S. shipments from.--			
Bosnia and Herzegovina	***	***	***
Iceland	***	***	***
Kazakhstan	***	***	***
Malaysia	***	***	***
Subject sources	***	***	***
Nonsubject sources	***	***	***
All import sources	***	***	***
Combined producers and importers	***	***	***

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Table D-1—Continued
Silicon metal: U.S. producers' and U.S. importers; U.S. shipments to aluminum end users (both primary and secondary), 2018-20

Item	Calendar year		
	2018	2019	2020
	Average unit value (dollars per STCS)		
U.S. producers' U.S. shipments.-- DC Alabama	***	***	***
Globe	***	***	***
MS silicon	***	***	***
All U.S. producers	***	***	***
U.S. importers' U.S. shipments from.-- Bosnia and Herzegovina	***	***	***
Iceland	***	***	***
Kazakhstan	***	***	***
Malaysia	***	***	***
Subject sources	***	***	***
Nonsubject sources	***	***	***
All import sources	***	***	***
Combined producers and importers	***	***	***
	Difference from combined AUV line (dollars per STCS)		
U.S. producers' U.S. shipments.-- DC Alabama	***	***	***
Globe	***	***	***
MS silicon	***	***	***
All U.S. producers	***	***	***
U.S. importers' U.S. shipments from.-- Bosnia and Herzegovina	***	***	***
Iceland	***	***	***
Kazakhstan	***	***	***
Malaysia	***	***	***
Subject sources	***	***	***
Nonsubject sources	***	***	***
All import sources	***	***	***
Combined producers and importers	***	***	***

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Table D-1—Continued
Silicon metal: U.S. producers' and U.S. importers; U.S. shipments to aluminum end users (both primary and secondary), 2018-20

Item	Calendar year		
	2018	2019	2020
	Share of quantity (percent)		
U.S. producers' U.S. shipments.-- DC Alabama	***	***	***
Globe	***	***	***
MS silicon	***	***	***
All U.S. producers	***	***	***
U.S. importers' U.S. shipments from.-- Bosnia and Herzegovina	***	***	***
Iceland	***	***	***
Kazakhstan	***	***	***
Malaysia	***	***	***
Subject sources	***	***	***
Nonsubject sources	***	***	***
All import sources	***	***	***
Combined producers and importers	***	***	***
	Ratio to overall consumption quantity (percent)		
U.S. producers' U.S. shipments.-- DC Alabama	***	***	***
Globe	***	***	***
MS silicon	***	***	***
All U.S. producers	***	***	***
U.S. importers' U.S. shipments from.-- Bosnia and Herzegovina	***	***	***
Iceland	***	***	***
Kazakhstan	***	***	***
Malaysia	***	***	***
Subject sources	***	***	***
Nonsubject sources	***	***	***
All import sources	***	***	***
Combined producers and importers	***	***	***

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Table D-1—Continued
Silicon metal: U.S. producers' and U.S. importers; U.S. shipments to aluminum end users (both primary and secondary), 2018-20

Item	Comparison years		
	2018-20	2018-19	2019-20
	Change in quantity (STCS)		
U.S. producers' U.S. shipments.-- DC Alabama	***	***	***
Globe	***	***	***
MS silicon	***	***	***
All U.S. producers	▼***	▼***	▼***
U.S. importers' U.S. shipments from.-- Bosnia and Herzegovina	▼***	▼***	▼***
Iceland	▲***	▲***	▼***
Kazakhstan	▼***	▲***	▼***
Malaysia	▲***	▲***	▲***
Subject sources	▲***	▲***	▼***
Nonsubject sources	▼***	▼***	▼***
All import sources	▲***	▲***	▼***
Combined producers and importers	▼***	▲***	▼***
	Percent change in quantity (percent)		
U.S. producers' U.S. shipments.-- DC Alabama	***	***	***
Globe	***	***	***
MS silicon	***	***	***
All U.S. producers	▼***	▼***	▼***
U.S. importers' U.S. shipments from.-- Bosnia and Herzegovina	▼***	▼***	▼***
Iceland	▲***	▲***	▼***
Kazakhstan	▼***	▲***	▼***
Malaysia	▲***	▲***	▲***
Subject sources	▲***	▲***	▼***
Nonsubject sources	▼***	▼***	▼***
All import sources	▲***	▲***	▼***
Combined producers and importers	▼***	▲***	▼***

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Table D-1—Continued
Silicon metal: U.S. producers' and U.S. importers; U.S. shipments to aluminum end users (both primary and secondary), 2018-20

Item	Comparison years		
	2018-20	2018-19	2019-20
	Change in AUVs (dollars per STCS)		
U.S. producers' U.S. shipments.-- DC Alabama	***	***	***
Globe	***	***	***
MS silicon	***	***	***
All U.S. producers	▼***	▼***	▼***
U.S. importers' U.S. shipments from.-- Bosnia and Herzegovina	▼***	▼***	▼***
Iceland	▼***	▼***	▼***
Kazakhstan	▼***	▼***	▼***
Malaysia	***	***	▲***
Subject sources	▼***	▼***	▼***
Nonsubject sources	▼***	▼***	▼***
All import sources	▼***	▼***	▼***
Combined producers and importers	▼***	▼***	▼***
	Percent change in AUVs (percent)		
U.S. producers' U.S. shipments.-- DC Alabama	***	***	***
Globe	***	***	***
MS silicon	***	***	***
All U.S. producers	▼***	▼***	▼***
U.S. importers' U.S. shipments from.-- Bosnia and Herzegovina	▼***	▼***	▼***
Iceland	▼***	▼***	▼***
Kazakhstan	▼***	▼***	▼***
Malaysia	***	***	▲***
Subject sources	▼***	▼***	▼***
Nonsubject sources	▼***	▼***	▼***
All import sources	▼***	▼***	▼***
Combined producers and importers	▼***	▼***	▼***

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent.

Source: Compiled from data submitted in response to Commission questionnaires.

Table D-2
Silicon Metal: U.S. producers' and U.S. importers' U.S. shipments to polysilicon end users, 2018-20

Item	Calendar year		
	2018	2019	2020
	Quantity (short tons contained silicon)		
U.S. producers' U.S. shipments.--			
DC Alabama	***	***	***
Globe	***	***	***
MS silicon	***	***	***
All U.S. producers	***	***	***
U.S. importers' U.S. shipments from.--			
Bosnia and Herzegovina	***	***	***
Iceland	***	***	***
Kazakhstan	***	***	***
Malaysia	***	***	***
Subject sources	***	***	***
Nonsubject sources	***	***	***
All import sources	***	***	***
Combined producers and importers	***	***	***
	Value (1,000 dollars)		
U.S. producers' U.S. shipments.--			
DC Alabama	***	***	***
Globe	***	***	***
MS silicon	***	***	***
All U.S. producers	***	***	***
U.S. importers' U.S. shipments from.--			
Bosnia and Herzegovina	***	***	***
Iceland	***	***	***
Kazakhstan	***	***	***
Malaysia	***	***	***
Subject sources	***	***	***
Nonsubject sources	***	***	***
All import sources	***	***	***
Combined producers and importers	***	***	***

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Table D-2—Continued
Silicon Metal: U.S. producers' and U.S. importers' U.S. shipments to polysilicon end users, 2018-20

Item	Calendar year		
	2018	2019	2020
	Average unit value (dollars per STCS)		
U.S. producers' U.S. shipments.-- DC Alabama	***	***	***
Globe	***	***	***
MS silicon	***	***	***
All U.S. producers	***	***	***
U.S. importers' U.S. shipments from.-- Bosnia and Herzegovina	***	***	***
Iceland	***	***	***
Kazakhstan	***	***	***
Malaysia	***	***	***
Subject sources	***	***	***
Nonsubject sources	***	***	***
All import sources	***	***	***
Combined producers and importers	***	***	***
	Difference from combined AUV line (dollars per STCS)		
U.S. producers' U.S. shipments.-- DC Alabama	***	***	***
Globe	***	***	***
MS silicon	***	***	***
All U.S. producers	***	***	***
U.S. importers' U.S. shipments from.-- Bosnia and Herzegovina	***	***	***
Iceland	***	***	***
Kazakhstan	***	***	***
Malaysia	***	***	***
Subject sources	***	***	***
Nonsubject sources	***	***	***
All import sources	***	***	***
Combined producers and importers	***	***	***

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Table D-2—Continued
Silicon Metal: U.S. producers' and U.S. importers' U.S. shipments to polysilicon end users, 2018-20

Item	Calendar year		
	2018	2019	2020
	Share of quantity (percent)		
U.S. producers' U.S. shipments.--			
DC Alabama	***	***	***
Globe	***	***	***
MS silicon	***	***	***
All U.S. producers	***	***	***
U.S. importers' U.S. shipments from.--			
Bosnia and Herzegovina	***	***	***
Iceland	***	***	***
Kazakhstan	***	***	***
Malaysia	***	***	***
Subject sources	***	***	***
Nonsubject sources	***	***	***
All import sources	***	***	***
Combined producers and importers	***	***	***
	Ratio to overall consumption quantity (percent)		
U.S. producers' U.S. shipments.--			
DC Alabama	***	***	***
Globe	***	***	***
MS silicon	***	***	***
All U.S. producers	***	***	***
U.S. importers' U.S. shipments from.--			
Bosnia and Herzegovina	***	***	***
Iceland	***	***	***
Kazakhstan	***	***	***
Malaysia	***	***	***
Subject sources	***	***	***
Nonsubject sources	***	***	***
All import sources	***	***	***
Combined producers and importers	***	***	***

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Table D-2—Continued
Silicon Metal: U.S. producers' and U.S. importers' U.S. shipments to polysilicon end users, 2018-20

Item	Calendar year		
	2018	2019	2020
	Share of value (percent)		
U.S. producers' U.S. shipments.--			
DC Alabama	***	***	***
Globe	***	***	***
MS silicon	***	***	***
All U.S. producers	***	***	***
U.S. importers' U.S. shipments from.--			
Bosnia and Herzegovina	***	***	***
Iceland	***	***	***
Kazakhstan	***	***	***
Malaysia	***	***	***
Subject sources	***	***	***
Nonsubject sources	***	***	***
All import sources	***	***	***
Combined producers and importers	***	***	***
	Ratio to overall consumption value (percent)		
U.S. producers' U.S. shipments.--			
DC Alabama	***	***	***
Globe	***	***	***
MS silicon	***	***	***
All U.S. producers	***	***	***
U.S. importers' U.S. shipments from.--			
Bosnia and Herzegovina	***	***	***
Iceland	***	***	***
Kazakhstan	***	***	***
Malaysia	***	***	***
Subject sources	***	***	***
Nonsubject sources	***	***	***
All import sources	***	***	***
Combined producers and importers	***	***	***

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Table D-2—Continued
Silicon Metal: U.S. producers' and U.S. importers' U.S. shipments to polysilicon end users, 2018-20

Item	Comparison years		
	2018-20	2018-19	2019-20
	Change in quantity (STCS)		
U.S. producers' U.S. shipments.-- DC Alabama	***	***	***
Globe	***	***	***
MS silicon	***	***	***
All U.S. producers	▼***	▼***	▼***
U.S. importers' U.S. shipments from.-- Bosnia and Herzegovina	***	***	***
Iceland	***	▲***	▼***
Kazakhstan	***	***	***
Malaysia	***	***	***
Subject sources	***	▲***	▼***
Nonsubject sources	▼***	▼***	▲***
All import sources	▼***	▼***	▲***
Combined producers and importers	▼***	▼***	▲***
	Percent change in quantity (percent)		
U.S. producers' U.S. shipments.-- DC Alabama	***	***	***
Globe	***	***	***
MS silicon	***	***	***
All U.S. producers	▼***	▼***	▼***
U.S. importers' U.S. shipments from.-- Bosnia and Herzegovina	***	***	***
Iceland	***	▲***	▼***
Kazakhstan	***	***	***
Malaysia	***	***	***
Subject sources	***	▲***	▼***
Nonsubject sources	▼***	▼***	▲***
All import sources	▼***	▼***	▲***
Combined producers and importers	▼***	▼***	▲***

Table continued on next page.

Table D-2—Continued
Silicon Metal: U.S. producers' and U.S. importers' U.S. shipments to polysilicon end users, 2018-20

Item	Comparison years		
	2018-20	2018-19	2019-20
	Change in AUVs (dollars per STCS)		
U.S. producers' U.S. shipments.-- DC Alabama	***	***	***
Globe	***	***	***
MS silicon	***	***	***
All U.S. producers	▼***	▼***	▼***
U.S. importers' U.S. shipments from.-- Bosnia and Herzegovina	***	***	***
Iceland	***	***	▼***
Kazakhstan	***	***	***
Malaysia	***	***	***
Subject sources	***	***	▼***
Nonsubject sources	▼***	▲***	▼***
All import sources	▼***	▲***	▼***
Combined producers and importers	▼***	▼***	▼***
	Percent change in AUVs (percent)		
U.S. producers' U.S. shipments.-- DC Alabama	***	***	***
Globe	***	***	***
MS silicon	***	***	***
All U.S. producers	▼***	▼***	▼***
U.S. importers' U.S. shipments from.-- Bosnia and Herzegovina	***	***	***
Iceland	***	***	▼***
Kazakhstan	***	***	***
Malaysia	***	***	***
Subject sources	***	***	▼***
Nonsubject sources	▼***	▲***	▼***
All import sources	▼***	▲***	▼***
Combined producers and importers	▼***	▼***	▼***

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent.

Source: Compiled from data submitted in response to Commission questionnaires.

APPENDIX E

MERCHANT MARKET DATA

Table E-1
Silicon metal: Apparent U.S. consumption, merchant market, 2018-20

Item	Calendar year		
	2018	2019	2020
	Quantity (short tons contained silicon)		
U.S. producers' U.S. shipments.--			
DC Alabama	***	***	***
Globe	***	***	***
MS silicon	***	***	***
All U.S. producers	***	***	***
U.S. imports from.--			
Bosnia and Herzegovina	9,350	10,493	8,319
Iceland	1,259	6,947	4,986
Kazakhstan	3,045	8,522	1,219
Malaysia	---	3,894	11,000
Subject sources	13,654	29,857	25,523
Nonsubject sources	118,966	126,190	111,609
All import sources	132,620	156,047	137,133
Apparent U.S. consumption	***	***	***
	Value (1,000 dollars)		
U.S. producers' U.S. shipments.--			
DC Alabama	***	***	***
Globe	***	***	***
MS silicon	***	***	***
All U.S. producers	***	***	***
U.S. imports from.--			
Bosnia and Herzegovina	21,653	20,079	14,562
Iceland	2,369	11,711	7,182
Kazakhstan	6,064	15,171	1,800
Malaysia	---	6,595	16,912
Subject sources	30,086	53,556	40,456
Nonsubject sources	315,333	301,596	230,038
All import sources	345,419	355,152	270,494
Apparent U.S. consumption	***	***	***

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent.

Source: Compiled from data submitted in response to Commission questionnaires and official U.S. import statistics based on General Imports using HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed February 6, 2021.

Table E-2
Silicon metal: Market shares, merchant market, 2018-20

Item	Calendar year		
	2018	2019	2020
	Quantity (short tons contained silicon)		
Apparent U.S. consumption	***	***	***
	Share of quantity (percent)		
U.S. producers' U.S. shipments.-- DC Alabama	***	***	***
Globe	***	***	***
MS silicon	***	***	***
All U.S. producers	***	***	***
U.S. imports from.-- Bosnia and Herzegovina	***	***	***
Iceland	***	***	***
Kazakhstan	***	***	***
Malaysia	***	***	***
Subject sources	***	***	***
Nonsubject sources	***	***	***
All import sources	***	***	***
	Value (1,000 dollars)		
Apparent U.S. consumption	***	***	***
	Share of value (percent)		
U.S. producers' U.S. shipments.-- DC Alabama	***	***	***
Globe	***	***	***
MS silicon	***	***	***
All U.S. producers	***	***	***
U.S. imports from.-- Bosnia and Herzegovina	***	***	***
Iceland	***	***	***
Kazakhstan	***	***	***
Malaysia	***	***	***
Subject sources	***	***	***
Nonsubject sources	***	***	***
All import sources	***	***	***

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent.

Source: Compiled from data submitted in response to Commission questionnaires and official U.S. import statistics based on General Imports using HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed February 6, 2021.

Figure E-1
Silicon metal: Apparent U.S. consumption, merchant market, 2018-20

* * * * * * *

Source: Compiled from data submitted in response to Commission questionnaires and official U.S. import statistics based on General Imports using HTS statistical reporting numbers 2804.69.1000 and 2804.69.5000, accessed February 6, 2021.

APPENDIX F

PRICE DATA EXCLUDING SALES TO DISTRIBUTORS

Three U.S. producers and three importers provided usable pricing data for sales of the requested products, although not all firms reported pricing for all products for all quarters.[1] Pricing data reported by these firms accounted for approximately *** percent of U.S. shipments of silicon metal (*** percent of U.S. producers' commercial shipments of silicon metal, none of U.S. shipments of subject imports from Bosnia and Herzegovina, *** percent for Iceland, *** percent for Kazakhstan, and *** percent for Malaysia in 2020.[2] As noted in part II, there ***,[3] and there is no reported price data for product 3 (silicon metal for chemical end users) from subject countries.

Price data for product 2 are presented in table F-1 (comparable to tables V-3) and figure F-1 (comparable to figures V-4).

[1] Per-unit pricing data are calculated from total quantity and total value data provided by U.S. producers and importers. The precision and variation of these figures may be affected by rounding, limited quantities, and producer or importer estimates.

[2] Pricing coverage is based on U.S. shipments reported in questionnaires excluding ***.

[3] ***.

Table F-1
Silicon metal: Weighted-average f.o.b. prices and quantities of domestic and imported product 2 and margins of underselling/(overselling), by quarter, 2018-20

Period	United States		Bosnia and Herzegovina			Iceland		
	Price (dollars per short ton contained silicon)	Quantity (short tons contained silicon)	Price (dollars per short ton contained silicon)	Quantity (short tons contained silicon)	Margin (percent)	Price (dollars per short ton contained silicon)	Quantity (short tons contained silicon)	Margin (percent)
2018: Jan.-Mar.	***	***	***	***	***	***	***	***
Apr.-June	***	***	***	***	***	***	***	***
July-Sept.	***	***	***	***	***	***	***	***
Oct.-Dec.	***	***	***	***	***	***	***	***
2019: Jan.-Mar.	***	***	***	***	***	***	***	***
Apr.-June	***	***	***	***	***	***	***	***
July-Sept.	***	***	***	***	***	***	***	***
Oct.-Dec.	***	***	***	***	***	***	***	***
2020: Jan.-Mar.	***	***	***	***	***	***	***	***
Apr.-June	***	***	***	***	***	***	***	***
July-Sept.	***	***	***	***	***	***	***	***
Oct.-Dec.	***	***	***	***	***	***	***	***

Period	Kazakhstan			Malaysia		
	Price (dollars per short ton contained silicon)	Quantity (short tons contained silicon)	Margin (percent)	Price (dollars per short ton contained silicon)	Quantity (short tons contained silicon)	Margin (percent)
2018: Jan.-Mar.	***	***	***	***	***	***
Apr.-June	***	***	***	***	***	***
July-Sept.	***	***	***	***	***	***
Oct.-Dec.	***	***	***	***	***	***
2019: Jan.-Mar.	***	***	***	***	***	***
Apr.-June	***	***	***	***	***	***
July-Sept.	***	***	***	***	***	***
Oct.-Dec.	***	***	***	***	***	***
2020: Jan.-Mar.	***	***	***	***	***	***
Apr.-June	***	***	***	***	***	***
July-Sept.	***	***	***	***	***	***
Oct.-Dec.	***	***	***	***	***	***

Note: Product 2: Sold to secondary aluminum producers; silicon metal less than 99.99% pure that contains a minimum of 97.0% silicon, a maximum of 2.00% iron, a maximum of 0.4% calcium, and no restriction of the aluminum content.

Figure F-1
Silicon metal: Weighted-average prices and quantities of domestic and imported product 2, by quarter, 2018-20

* * * * * * *

Product 2: Sold to secondary aluminum producers; silicon metal less than 99.99% pure that contains a minimum of 97.0% silicon, a maximum of 2.00% iron, a maximum of 0.4% calcium, and no restriction of the aluminum content.

Source: Compiled from data submitted in response to Commission questionnaires.

In general, prices decreased during 2018-20. Table F-2 summarizes the price trends, by country and by product. As shown in the table, the decrease for product 2 from Kazakhstan was *** percent. The decreases for product sold to secondary aluminum end users (product 2) was greater than decrease in the published silicon metal index of 25.7 percent (figure V-2), while the decrease in the price of product sold primary aluminum end users and to chemical end users (products 1 and 3) was less than the published index.

Table F-2
Silicon metal: Summary of weighted-average f.o.b. prices for products 1-3 from the United States and Bosnia and Herzegovina, Iceland, Kazakhstan, and Malaysia

Item	Number of quarters	Low price (per short ton contained silicon)	High price (per short ton contained silicon)	Change in price (percent)
Product 1:				
United States	***	***	***	***
Kazakhstan	***	***	***	***
Product 2:				
United States	***	***	***	***
Bosnia and Herzegovina	***	***	***	***
Iceland	***	***	***	***
Kazakhstan	***	***	***	***
Malaysia	***	***	***	***
Product 3:				
United States	***	***	***	***

Note: Percentage change from the first quarter of 2018 to the last quarter in 2020. Only countries for which prices were available are listed in this table. The price of product 2 from Iceland decreased ***.

Source: Compiled from data submitted in response to Commission questionnaires.

As shown in table F-3, (similar to table V-7) subject imports undersold U.S. product in 12 of the 31 instances, (*** short tons of contained silicon) and oversold U.S. product in the remaining 10 instances (*** short tons of contained silicon). Prices were not available for product imported from Bosnia and Herzegovina. Prices for product imported from Iceland were below those for U.S.-produced product in 4 of 10 instances (*** short tons contained silicon); margins of underselling ranged from *** percent in the remaining 6 instances (*** short tons contained silicon); margins of overselling ranged from *** percent. Prices for product imported from Kazakhstan were below those for U.S.-produced product in 11 of 14 instances (*** short tons contained silicon); margins of underselling ranged from *** percent. In the remaining 3 instances (*** short tons contained silicon), prices for product from Kazakhstan were between *** percent above prices for the domestic product. Prices for product imported from Malaysia were below those for U.S.-produced product in six of seven instances (*** short tons contained silicon); margins of underselling ranged from *** percent. In the remaining 1 instance (*** short tons contained silicon), prices for product from Malaysia was *** percent above prices for the domestic product.

Table F-3
Silicon metal: Instances of underselling/overselling and the range and average of margins, by country, 2018-20

Source	Underselling				
	Number of quarters	Quantity (short tons contained silicon)	Average margin (percent)	Margin range (percent)	
				Min	Max
Product 1	---	---	---	---	---
Product 2	***	***	***	***	***
Total, underselling	***	***	***	***	***
Bosnia and Herzegovina	***	***	***	***	***
Iceland	***	***	***	***	***
Kazakhstan	***	***	***	***	***
Malaysia	***	***	***	***	***
Total, underselling	***	***	***	***	***
Source	**(Overselling)**				
	Number of quarters	**Quantity (short tons contained silicon)**	**Average margin (percent)**	**Margin range (percent)**	
				Min	**Max**
Product 1	***	***	***	***	***
Product 2	***	***	***	***	***
Total, overselling	***	***	***	***	***
Bosnia and Herzegovina	***	***	***	***	***
Iceland	***	***	***	***	***
Kazakhstan	***	***	***	***	***
Malaysia	***	***	***	***	***
Total, overselling	***	***	***	***	***

Note: These data include only quarters in which there is a comparison between the U.S. and subject product. Product 3 is not shown in the table since there were no import price data.

Source**:** Compiled from data submitted in response to Commission questionnaires.

APPENDIX G

U.S. PRODUCERS' FINANCIAL RESULTS ON SILICON METAL (MERCHANT MARKET ONLY)

Table G-1
Silicon metal: Results of merchant only operations of U.S. producers, 2018-20

Item	Calendar year		
	2018	2019	2020
	Quantity (short tons contained silicon)		
Commercial sales	***	***	***
	Value (1,000 dollars)		
Commercial sales	***	***	***
Cost of goods sold.-- Raw materials	***	***	***
Electricity	***	***	***
Direct labor	***	***	***
Other factory costs	***	***	***
Less: byproduct revenue	***	***	***
Total COGS	***	***	***
Gross profit or (loss)	***	***	***
SG&A expense	***	***	***
Operating income or (loss)	***	***	***
Interest expense	***	***	***
Other expenses	***	***	***
Other income items	***	***	***
Net income or (loss)	***	***	***
Depreciation/amortization	***	***	***
Estimated cash flow from operations	***	***	***
	Ratio to net sales (percent)		
Cost of goods sold.-- Raw materials	***	***	***
Electricity	***	***	***
Direct labor	***	***	***
Other factory costs	***	***	***
Less: byproduct revenue	***	***	***
Average COGS	***	***	***
Gross profit or (loss)	***	***	***
SG&A expense	***	***	***
Operating income or (loss)	***	***	***
Net income or (loss)	***	***	***

Table continued on next page.

Table G-1--Continued
Silicon metal: Results of merchant only operations of U.S. producers, 2018-20

Item	Calendar year		
	2018	2019	2020
	Ratio to total COGS (percent)		
Cost of goods sold before byproduct offset--			
Raw materials	***	***	***
Electricity	***	***	***
Direct labor	***	***	***
Other factory costs	***	***	***
Average COGS	***	***	***
	Unit value (dollars per short tons contained silicon)		
Total net commercial sales	***	***	***
Cost of goods sold.--			
Raw materials	***	***	***
Electricity	***	***	***
Direct labor	***	***	***
Other factory costs	***	***	***
Less: byproduct revenue	***	***	***
Average COGS	***	***	***
Gross profit or (loss)	***	***	***
SG&A expense	***	***	***
Operating income or (loss)	***	***	***
Net income or (loss)	***	***	***
	Number of firms reporting		
Operating losses	***	***	***
Net losses	***	***	***
Data	***	***	***

Source: Compiled from data submitted in response to Commission questionnaires.

Table G-2
Silicon metal: Changes in U.S. producers' merchant only AUV's, 2018-20

Item	Between calendar years		
	2018-20	2018-19	2019-20
	Change in AUVs (percent)		
Commercial sales	***	***	***
Cost of goods sold.--			
Raw materials	***	***	***
Electricity	***	***	***
Direct labor	***	***	***
Other factory costs	***	***	***
Less: byproduct revenue	***	***	***
Average COGS	***	***	***
	Change in AUVs (dollars per short tons contained silicon)		
Commercial sales	***	***	***
Cost of goods sold.--			
Raw materials	***	***	***
Electricity	***	***	***
Direct labor	***	***	***
Other factory costs	***	***	***
Less: byproduct revenue	***	***	***
Average COGS	***	***	***
Gross profit or (loss)	***	***	***
SG&A expense	***	***	***
Operating income or (loss)	***	***	***
Net income or (loss)	***	***	***

Source: Compiled from data submitted in response to Commission questionnaires.

Table G-3
Silicon metal: Variance analysis of the merchant only financial results of U.S. producers, 2018-20

Item	Between calendar years		
	2018-20	2018-19	2019-20
	Value (1,000 dollars)		
Net sales:			
Price variance	***	***	***
Volume variance	***	***	***
Net sales variance	***	***	***
COGS:			
Cost variance	***	***	***
Volume variance	***	***	***
COGS variance	***	***	***
Gross profit variance	***	***	***
SG&A expenses:			
Cost/expense variance	***	***	***
Volume variance	***	***	***
Total SG&A expense variance	***	***	***
Operating income variance	***	***	***
Summarized as:			
Price variance	***	***	***
Net cost/expense variance	***	***	***
Net volume variance	***	***	***

Note.--The Commission's traditional variance analysis is calculated in three parts: sales variance, cost of goods sold ("COGS") variance, and selling, general, and administrative ("SG&A") expenses variance. Each part consists of a price variance (in the case of the sales variance) or a cost or expense variance (in the case of the COGS and SG&A expense variances), and a volume variance. The sales or cost/expense variance is calculated as the change in unit price or per-unit cost/expense times the new volume, while the volume variance is calculated as the change in volume times the old unit price or per-unit cost/expense. As summarized at the bottom of the table, the price variance is from sales, the cost/expense variance is the sum of those items from COGS and SG&A variances, respectively, and the volume variance is the sum of the volume components of the net sales, COGS, and SG&A expenses variances. The Commission's variance analysis is generally more meaningful when product mix and/or customer mix remain the same throughout the period.

Source: Compiled from data submitted in response to Commission questionnaires.

Table G-4
Silicon metal: Results of merchant only operations of U.S. producers, by firm, 2018-20

Item	Calendar year		
	2018	2019	2020
	Total net sales (short tons contained silicon)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	Total net sales (1,000 dollars)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	Cost of goods sold (1,000 dollars)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	Gross profit or (loss) (1,000 dollars)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	SG&A expenses (1,000 dollars)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	Operating income or (loss) (1,000 dollars)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	Net income or (loss) (1,000 dollars)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***

Table continued on next page.

Table G-4--Continued
Silicon metal: Results of merchant only operations of U.S. producers, by firm, 2018-20

Item	Calendar year		
	2018	2019	2020
	COGS to net sales ratio (percent)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	SG&A expense to net sales ratio (percent)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	Operating income or (loss) to net sales ratio (percent)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	Net income or (loss) to net sales ratio (percent)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	Unit net sales value (dollars per short tons contained silicon)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	Unit raw materials (dollars per short tons contained silicon)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	Unit electricity cost (dollars per short tons contained silicon)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***

Table continued on next page.

Table G-4--Continued
Silicon metal: Results of merchant only operations of U.S. producers, by firm, 2018-20

Item	Calendar year		
	2018	2019	2020
	Unit direct labor (dollars per short tons contained silicon)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	Unit other factory costs (dollars per short tons contained silicon)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	Unit COGS (dollars per short tons contained silicon)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	Unit gross profit or (loss) (dollars per short tons contained silicon)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	Unit SG&A expenses (dollars per short tons contained silicon)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	Unit operating income or (loss) (dollars per short tons contained silicon)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***
	Unit net income or (loss) (dollars per short tons contained silicon)		
DC Alabama	***	***	***
Globe	***	***	***
MS Silicon	***	***	***
All firms	***	***	***

Source: Compiled from data submitted in response to Commission questionnaires.

APPENDIX H

U.S. IMPORTS FROM ICELAND SUBJECT TO COMMERCE'S CRITICAL CIRCUMSTANCES DETERMINATION END-OF-PERIOD INVENTORIES

During 2020, the overall end-of-period inventories for U.S. imports from Iceland were *** short tons, while the beginning-of-period inventories were *** short tons in January 2020 for U.S. imports from Iceland. From January 2020 to December 2020, the inventories of U.S. imports from Iceland decreased by *** percent.

Three firms reported that they had imported silicon metal from Iceland during 2020 and had end-of-period inventories. *** had a combined *** short tons of end-of-period inventories of silicon metal during 2020. *** accounted for *** percent (or ***) of the end-of period inventories of U.S. imports of silicon metal from Iceland during 2020, while ***. During the six months after the filing of the petitions (July through December 2020), the end-of-periods for *** initially increased from July to August 2020 by *** percent, then decreased each month until December 2020. From July-December 2020, *** end-of-period inventories of its U.S. imports from Iceland decreased by *** percent. Due to time constraints and the high percentage of inventories attributable to ***, staff did not reach out to ***.

Table H-1
Silicon metal: CCMA's U.S. imports from Iceland end-of-period inventories, July-December 2020

Month	Actual monthly quantity (STCS)	Percentage change per month (percent)
Petition file date: June 30, 2020		
July 2020	***	--
August 2020	***	▲***
September 2020	***	▼ ***
October 2020	***	▼ ***
November 2020	***	▼ ***
December 2020	***	▼ ***

Note.--Shares and ratios shown as "0.0" represent values greater than zero, but less than "0.05" percent.

Source: Compiled from data submitted in response to Commission questionnaires.