- In 2016, China's *13th Five-year National Economic and Social Development Plan Outline* (*13th Five-year Plan*) called for the active promotion of advanced semiconductor technology.[639]

A series of other government policies and planning documents echo the consistent message of the Five-year Plans. For instance, policies addressing the broad development of science and technology call for the support of a domestic IC industry.[640] In addition, the government released several policies and plans that are specific to the IC industry, and call for its promotion and development.[641]

MIIT's issuance of the *Guidelines for the Development and Promotion of the Integrated Circuit Industry* (*IC Guidelines*) in 2014 marked a turning point in the evolution of Chinese policy in the IC sector. This measure called for establishing a National IC Industry Development Leading Small Group, with responsibility for the overall design and coordination of China's IC industry development.[642]

The *IC Guidelines* also called for substantial funding to support the growth of China's IC industry. The *IC Guidelines* directed the creation of a National IC Fund to mobilize capital from large enterprises, financial organizations, and society to invest in the development of China's IC industry and promote industrial upgrading.[643] The *IC Guidelines* also called for policy banks (in particular, China Exim and CDB) and commercial banks to provide financial support to the IC industry.[644]

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[639] *13th Five-year National Economic and Social Development Plan Outline* Ch. 23 § 1 (adopted by the NPC on Mar. 16, 2016).

[640] These include the *Notice on Issuing the National Medium- and Long-Term Science and Technology Development Plan Outline (2006-2020)* (State Council, Guo Fa [2005] No. 44, issued Dec. 26, 2005); see also *Several Supporting Policies for Implementing the "National Medium- and Long-Term Science and Technology Development Plan Outline (2006-2020)"* (State Council, Guo Fa [2006] No. 6, issues Feb. 7, 2006); *11th Five-year Science and Technology Development Plan* (MOST, issued Oct. 27, 2006); *Electronic Information Industry Restructuring and Revitalization Plan* (State Council, published Apr. 15, 2009); *Decision on Accelerating and Fostering the Development of Strategic Emerging Industries* (State Council, Guo Fa [2010] No. 32, issued Oct. 18, 2010); *Notice on the National 12th Five-year Science and Technology Development Plan* (MOST, issued July 4, 2011); *Notice on Corporate Income Tax Policies to Further Encourage the Development of the Software and Integrated Circuit Industries* (State Council, Guo Fa [2011] No. 4, issued Jan. 28, 2011); *Notice on Issuing the 12th Five-year National Strategic Emerging Industries Development Plan* (State Council, Guo Fa [2012] No. 28, issued July 9, 2012); *Made in China 2025 Notice*; *Made in China 2025 Roadmap*; *Ministry of Industry and Information Technology Notice on Issuing the Industry Technology Innovation Capacity Development Plan (2016-2020)* (MIIT, Gong Xin Bu Gui [2016] No. 344, issued Oct. 31, 2016); *Notice on Issuing the National 13th Five-year Science and Technology Innovation Plan* (State Council, Guo Fa [2016] No. 43, issued July 28, 2016); *Notice on the 13th Five-year Strategic Emerging Industries Development Plan* (State Council, Guo Fa [2016] No. 67, issued Nov. 29, 2016).

[641] *12th Five-year Development Plan for the Integrated Circuit Industry* [*hereinafter* "IC 12th Five-year Plan"] (MIIT, issued Feb. 24, 2012); *Notice on Issuing Several Policies to Further Encourage the Development of the Software and Integrated Circuit Industries* (State Council, Guo Fa) 2011] No. 4, issued Jan. 28, 2011); *Notice on Issuing Several Policies to Encourage the Development of the Software and Integrated Circuit Industries* (State Council, Guo Fa [2000] No. 18, issued June 24, 2000).

[642] *IC Guidelines* § 4(1).

[643] *IC Guidelines* § 4(2).

[644] *IC Guidelines* § 4(3).

Taken together, the series of policies and plans issued by the Chinese governments set out a comprehensive strategy for developing indigenous IC capacity and reducing imports. In these documents, the Chinese government disapproves of the fact that China relies on imports of IC products, and underscores the importance of achieving a self-sufficient IC industry that is capable of meeting domestic demand and contributing to exports.[645] Indeed, some plans set specific targets for domestic market share to be achieved by Chinese companies,[646] and call for a technologically advanced and "secure and reliable" IC industry by 2020.[647]

China's strategy calls for creating a closed-loop semiconductor manufacturing ecosystem with self-sufficiency at every stage of the manufacturing process – from IC design and manufacturing to packaging and testing, and the production of related materials and equipment.[648]

A central pillar of this strategy is achieving technology transfer through foreign acquisitions. For example, the *Notice on Issuing the Industrial Technology Innovation Capability Development Plan (2016-2020)* expressly encourages foreign acquisitions to increase the international competitiveness of China's domestic industry through "*technology acquisition*"[649] and "*technology transfer*[650]."[651] The *National 13th Five-year Science and Technology Innovation Plan* calls for the "capture[652] of 'key core technologies' (electronic components, high-end telecom chips, foundational software), integrated circuit equipment, broadband mobile communications […]".[653] State plans also underscore the need to apply the IDAR method to cultivate the domestic IC industry.[654]

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[645] *See e.g., Notice on Issuing Several Policies to Encourage the Development of the Software and Integrated Circuit Industries* (State Council, Guo Fa [2000] No. 18, issued June 30, 2000), which provides at art. 2: "Through 5 to 10 years of efforts, domestically produced software products are to be able to satisfy a large portion of domestic market demand, and achieve a large volume of exports; domestically produced integrated circuit products are to be able to satisfy a large portion of domestic market demand, and achieve a certain volume of exports. At the same time, further shrink the gap with advanced countries in developing and manufacturing technology." *See also* § 1.1.1 of the *Made in China 2025 Roadmap*, which notes that in 2015, China's domestic IC production was $48.3 billion, which satisfied 41 percent of China's domestic demand. China's domestic IC production is forecast to reach $85.1 billion by 2020, meeting 49 percent of China's domestic demand, and $183.7 billion by 2030, meeting 75 percent of China's domestic demand. Therefore, meeting domestic demand, increasing China's rate of IC self-sufficiency, and at the same time satisfying China's needs for national security is the greatest requirement and motivation of developing China's IC industry.

[646] *See e.g., Notice on the 12th Five-year Strategic Emerging Industries Development Plan* (State Council, Guo Fa [2012] No. 28, issued July 9, 2012), which provides at § 4(1): "By 2015, raise IC industry value-added domestic market share from five percent to 15 percent."

[647] *IC Guidelines* § 2(3).

[648] *IC Guidelines* § 2(3); *Notice on the 12th Five-year Strategic Emerging Industries Development Plan*, Box 5.

[649] English translation of the Chinese term *jishu binggou*.

[650] English translation of the Chinese term *jishu zhuanyi*.

[651] *Ministry of Industry and Information Technology Notice on Issuing the Industry Technology Innovation Capacity Development Plan (2016-2020)* (MIIT, Gong Xin Bu Gui [2016] No. 344, issued Oct. 31, 2016) (emphasis added).

[652] English translation of the Chinese term *gongke*.

[653] *Notice on Issuing the National 13th Five-year Science and Technology Innovation Plan* Ch. 4 § 1 (State Council, Guo Fa [2016] No. 43, issued Aug. 8, 2016).

[654] *IC 12th Five-year Plan* § 3(1), "Guiding Thoughts, Basic Principles, and Development Targets". ("Strengthen introduce, digest, absorb, and re-innovate, and tread a path of method innovation and internationalizing development.").

State funding plays a key role in this acquisition strategy. State policies call on the departments under the State Council and all levels of local governments to develop financing measures, including policy funds, loan guarantees, and new financial instruments, to support this effort.[655]

Ultimately, the objective of these policies is to create competitive Chinese enterprises in the IC sector. The policies prioritize the cultivation of strong backbone enterprises to upgrade domestic competitiveness and perfect the industrial ecosystem.[656] The formation of a favorable industrial ecosystem environment is intended to include clusters of upstream and downstream enterprises achieving breakthroughs and upgrading along the value chain.[657] These enterprises – supported by a network of government bodies, investment funds, research institutions, legal organizations, and other intermediary organizations – should play a key role in acquiring foreign technology and introducing it to the domestic industrial ecosystem.[658] The *13th Five-year Science and Technology Innovation Plan* released in 2016 calls specifically for supporting Beijing and Shanghai in building globally influential science and technology innovation centers, including internationally competitive high-tech industrial clusters.[659]

Chinese Investments in the U.S. Integrated Circuit Sector

In recent years, these policy directives have prompted a flood of foreign acquisitions. Since 2014, when the government issued the Guidelines, Chinese companies and investors – often backed by state capital – have undertaken a series of acquisitions to achieve technology breakthrough, shrink the technology gap between China and advanced countries, cultivate domestic innovation clusters, and reduce China's reliance on IC imports. Government leadership in these operations is clear. In many cases, the Chinese acquirers openly admit the role played by the state in guiding and facilitating these acquisitions.

Below, several Chinese acquisitions of U.S. companies and assets that illustrate this development are discussed in detail.

Beijing E-Town Chipone/iML

On June 1, 2016, California-based Exar Corporation agreed to sell its subsidiary, Integrated Memory Logic Limited (iML), to Beijing E-Town Chipone Technology Co., Ltd. (Beijing E-Town Chipone) for $136 million. iML is a leading provider of power management and color calibration solutions for the flat-panel display and LED lighting markets.[660]

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[655] *Notice on Issuing Several Policies on Further Encouraging the Development of the Software and Integrated Circuit Industries* § 4(2) (State Council, Guo Fa [2011] No. 4, issued Jan. 28, 2011); *Electronic Information Industry Restructuring and Revitalization Plan* § 2(12) (State Council, issued Apr. 15, 2009).
[656] *IC 12th Five-year Plan* § 4(1).
[657] *IC Guidelines* § 4(6).
[658] *Notice on the 13th Five-year National Strategic Emerging Industries Development Plan* § 9(3) (State Council, Guo Fa [2016] No. 67, issued Nov. 29, 2016).
[659] *Notice on Issuing the National 13th Five-year Science and Technology Innovation Plan* Ch. 11, § 3 (State Council, Guo Fa [2016] No. 43, issued Aug. 8, 2016).
[660] Exar Corporation 8-K filed with the Securities and Exchange Commission on May 31, 2015. Commission File No. 0-14225.

Beijing E-Town Chipone was formed by Beijing E-Town and Chipone Technology Co., Ltd. (Chipone). (Beijing E-Town is both a separate entity and a partner with Chipone in forming Beijing E-Town Chipone, the vehicle used to acquire iML.) Beijing E-Town is an SOE, and provided the largest source of capital for the acquisition of iML.[661] As discussed in Section IV.B.5, above, Beijing E-Town was established and approved by the Beijing Municipal Government in February 2009, and is wholly owned and controlled by the Beijing Economic-Technological Development Zone State Asset Management Office. [662]

Beijing E-Town's investment strategy reflects Chinese government policy and strategy. According to a 2015 presentation by General Manager Wang Xiaobo, Beijing E-Town seeks to integrate government leadership and market operations in building a system of funds that includes the National IC Fund, provincial/municipal-level funds, and smaller VC funds.[663] This system of funds seeks to accelerate industrial clustering, incubate innovation, and cultivate an industrial ecosystem.[664]

A key aspect of Beijing E-Town's investment philosophy is the objective of clustering technology companies in the Beijing Economic-Technological Development Zone.[665] According to an article on the Beijing Economic-Technological Development Zone website, sources familiar with the acquisition say that after Chipone has integrated iML, Chipone plans to move iML operations to its headquarters in the Beijing Economic-Technological Development Zone.[666]

Beijing E-Town's goal is to partner with domestic industry leaders to promote international acquisitions to acquire a number of key technologies in the IC industry – including mobile telecom base chips, RF chips, memory chips, IGBT / power electronics, LCD driver chips, CPU

[661] To finance the acquisition entity, Beijing E-Town International Emerging Industries Investment Center, which is 92.83 percent owned by Beijing E-Town, contributed CNY 500 million ($74 million) (45.5 percent), Chipone contributed CNY 400 million ($59 million) (36.4 percent), and real-estate company named Beijing Yongchang Huanyu contributed CNY 200 million ($30 million) (18.2 percent), for a total of CNY 1.1 billion ($163 million). *See China's National Enterprise Credit Information Publicity System* [Chinese], *available at* http://www.gsxt.gov.cn; *Qi Xin Bao database* [Chinese], *available at* http://www.qixin.com; *CCXR 2017 Credit Report on Beijing E-Town International Investment and Development Co., Ltd.* 22 [Chinese] (Credit Committee [2017] No. G229-1).

[662] *CCXR 2017 Credit Report on Beijing E-Town International Investment and Development Co., Ltd.* [Chinese] (Credit Committee [2017] No. G229-1).

[663] Wang Xiaobo, General Manager Beijing E-Town, Presentation at TIF China 2015, *Establishing an Investment Financing Platform; Promoting Development of the Integrated Circuit Industry* [Chinese] (Mar. 2015), *available at* http://www.semi.org/en/sites/semi.org/files/data15/docs/Wangxiaobo_TIF.pdf.

[664] Wang Xiaobo, General Manager Beijing E-Town, Presentation at TIF China 2015, *Establishing an Investment Financing Platform; Promoting Development of the Integrated Circuit Industry* [Chinese] (Mar. 2015), *available at* http://www.semi.org/en/sites/semi.org/files/data15/docs/Wangxiaobo_TIF.pdf.

[665] Wang Xiaobo, General Manager Beijing E-Town, Presentation at TIF China 2015, *Establishing an Investment Financing Platform; Promoting Development of the Integrated Circuit Industry* [Chinese] (Mar. 2015), *available at* http://www.semi.org/en/sites/semi.org/files/data15/docs/Wangxiaobo_TIF.pdf.

[666] *Development Area's IC Industry Pours a Strong Dose of 'Chips'* [Chinese], BDA Nov. 11, 2016, *available at* http://www.bda.gov.cn/cms/jryz/136640.htm.

chips, MEMS sensor chips. This strategy is intended to effect technology transfer, and in so doing, achieve the government's stated objective of reducing China's reliance on IC imports.[667]

Consistent with this strategy, Beijing E-Town's partner in the iML acquisition, Chipone, has publicly stated that the iML acquisition was undertaken to further Chinese national policy goals to limit IC imports. According to Chipone's press release for the iML acquisition, domestic Chinese flat-panel display chip producers have an obligation to substitute domestic production for imports, and the acquisition of iML would reduce IC imports in the flat-panel display industry.[668]

The iML acquisition hinged on Beijing E-Town's financial support, which took three forms: (1) a loan guarantee of CNY 200 million ($30 million) to Chipone;[669] (2) the provision of land and capital to one of Chipone's largest customers – the liquid crystal display manufacturer BOE,[670] which is also located in the Beijing Economic-Technological Development Zone cluster;[671] and (3) a financial commitment of CNY 10 billion ($1.5 billion) to the National IC Fund by Beijing E-Town on behalf of Beijing municipality,[672] which played an indirect role in the acquisition of iML.[673]

Beijing E-Town/Mattson

[667] Wang Xiaobo, General Manager Beijing E-Town, Presentation at TIF China 2015, *Establishing an Investment Financing Platform; Promoting Development of the Integrated Circuit Industry* [Chinese] (Mar. 2015), *available at* http://www.semi.org/en/sites/semi.org/files/data15/docs/Wangxiaobo_TIF.pdf.
[668] Press Release, Chipone, Chipone Announces Acquisition of iML, 1+1>2 Strengthen Future Development New Force [Chinese] (Nov. 10, 2016), *available at* http://www.chiponeic.com/content/details11_299.html.
[669] *CCXR 2017 Credit Report on Beijing E-Town International Investment and Development Co., Ltd.* 19 [Chinese] (Credit Committee [2017] No. G229-1).
[670] *Chipone's LCD Driver Chip Mass Produced for BOE's 32-inch TV Screen* [Chinese], CHIPONE, Oct. 29, 2015, *available at* http://www.chiponeic.com/content/details11_267.html. Wang Xiaobo, General Manager Beijing E-Town, Presentation at TIF China 2015, *Establishing an Investment Financing Platform; Promoting Development of the Integrated Circuit Industry* [Chinese] (Mar. 2015), *available at* http://www.semi.org/en/sites/semi.org/files/data15/docs/Wangxiaobo_TIF.pdf.
[671] Wang Xiaobo, General Manager Beijing E-Town, Presentation at TIF China 2015, *Establishing an Investment Financing Platform; Promoting Development of the Integrated Circuit Industry* [Chinese] (Mar. 2015), *available at* http://www.semi.org/en/sites/semi.org/files/data15/docs/Wangxiaobo_TIF.pdf.
[672] *CCXR 2017 Credit Report on Beijing E-Town International Investment and Development Co., Ltd.* 12 [Chinese] (Credit Committee [2017] No. G229-1).
[673] SMIC received an investment of approximately $400 million from the National IC Fund in February 2015. Press Release, SMIC Receives Investment from China Integrated Circuit Industry Investment Fund (Feb. 12, 2015), http://www.smics.com/eng/press/press_releases_details.php?id=264990. SMIC received another investment of approximately $750 million from the Shanghai IC Fund in January 2016. *SMIC to Benefit from $3 Billion Investment*, EE TIMES, Jan. 26, 2016. Beijing E-town also provided CNY 700 million ($111 million) to finance the B2 300nm fab, which is located in the Beijing Economic-Technological Development Area (Beijing E-Town Investment Strategy - March 2015 [Chinese], slide 13). SMIC is both an investor in and a major customer of Chipone. In March 2014, SMIC established China Fortune-Tech Capital with an initial size of CNY 500 million ($76 million), of which 75 percent came from SMIC and 25 percent came from Finehome Holding Group. (*SMIC Establishes Fund to Invest in Integrated Circuits* [Chinese], SINA FINANCE, Mar. 3, 2014, http://finance.sina.com.cn/stock/hkstock/ggscyd/20140303/094118384624.shtml). Chipone lists investment from China Fortune-Tech Capital in December 2015 as a major milestone. *Chipone IC Timeline*, CHIPONE, http://www.chiponeic.com/auto/f-course.html. Chipone signed the agreement to acquire iML six months after receiving this investment and completed the acquisition 11 months after.

In December 2015, a wholly-owned subsidiary of Beijing E-Town acquired Mattson Technology, Inc. (Mattson), a global semiconductor wafer processing equipment provider.[674] Under the terms of the sale, Beijing E-Town acquired all of the outstanding shares of Mattson for $3.80 per share in cash. The price "represents a 55 percent premium to the 30-trading day average closing price for the period ending December 1, 2015, a 23 percent premium to Mattson's closing stock price on December 1, 2015, and values Mattson's equity at approximately $300 million on a fully diluted basis."[675]

According to Beijing E-Town's 2016 bond prospectus, through this acquisition Beijing E-Town acquired the "millisecond anneal, rapid thermal processing, laser etching, and other key technologies in the semiconductor chip processing area."[676] Beijing E-Town explained that, along with other IC acquisitions, the Mattson acquisition implemented the national strategy of "cultivating strategic emerging industries" and "strengthening smart manufacturing capability."[677]

Uphill Investment Co./Integrated Silicon Solutions (ISSI)

In June 2015, the shareholders of Integrated Silicon Solutions (ISSI) approved the company's acquisition by Uphill Investment Co. (Uphill), a Chinese investment consortium led by SummitView Capital, eTown MemTek, Hua Capital, and Huaqing Jiye Investment Management Co. Ltd.

After several rounds of bidding against U.S.-based Cypress Semiconductor Corp. (Cypress), Uphill's winning bid and final purchase price was $23 per share, yielding a purchase price of approximately $765 million[678] – well in excess of the initial price proposed by ISSI ($18.19 per share).[679] At the time, industry analysts observed that "ISSI was a particularly desirable acquisition for Cypress because of its patents."[680] Nonetheless, Cypress was outbid by its Chinese competitor.

Uphill's acquisition of ISSI was made possible by state support and financing. The Uphill consortium was comprised of a network of investment funds working to achieve Chinese state objectives:

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[674] Beijing E-Town Dragon Semiconductor Industry Investment Center (Limited Partnership) (E-Town Dragon) is a wholly owned subsidiary of Beijing E-Town International Investment & Development Co., Ltd. (Beijing E-Town). *See* CCXR, 2017 CREDIT REPORT ON BEIJING E-TOWN 22 (2017).

[675] Press Release, Mattson Technology, Mattson Technology, Inc. Enters into a Definitive Agreement to be Acquired by the Beijing E-Town Dragon Semiconductor Industry Investment Center for $3.80 per Share in Cash, (Dec. 1, 2015).

[676] BEIJING E-TOWN INTERNATIONAL INVESTMENT AND DEVELOPMENT CO., LTD. 2016 PUBLIC BOND ISSUANCE COLLECTION MANUAL ABSTRACT 1-2-58 [Chinese] (July 14, 2016).

[677] BEIJING E-TOWN INTERNATIONAL INVESTMENT AND DEVELOPMENT CO., LTD. 2016 PUBLIC BOND ISSUANCE COLLECTION MANUAL ABSTRACT 1-2-50 [Chinese] (July 14, 2016).

[678] BEIJING E-TOWN INTERNATIONAL INVESTMENT AND DEVELOPMENT CO., LTD. 2016 PUBLIC BOND ISSUANCE COLLECTION MANUAL ABSTRACT 1-2-58 [Chinese] (July 14, 2016).

[679] Integrated Silicon Solutions, Inc. Schedule 14A filed with the SEC: "Uphill Investment Co. Merger Proposal, Special Meeting of Stockholders, June 19, 2015" [Chinese] (slides 4, 10).

[680] Gary Hilson, *ISSI Acquired: An Analyst's Thoughts*, EE TIMES, July 8, 2015.

- SummitView Capital: This entity manages the Shanghai Government's SummitView IC and IT Industry Fund, which was jointly established with the Shanghai government-owned Venture Capital Guiding Fund of Shanghai in November 2014 in response to the State Council's *IC Guidelines*.[681] According to the Shanghai Government's *Provisional Measures on the Administration of the Shanghai Venture Capital Guiding Fund*, the purpose of the Venture Capital Guiding Fund of Shanghai is to "vigorously advance indigenous innovation," and "accelerate the cultivation and development of strategic emerging industries."[682] The SummitView Capital website states that "using high-level national strategy and industrial strategy as the starting point, we establish a whole-of-industry investment fund and advance the construction and optimization of an industry ecosystem."[683]

- Hua Capital: This fund was established by Tsinghua Holdings and China Fortune-Tech Capital,[684] a fund under the Semiconductor Manufacturing International Corporation (SMIC). Hua Capital manages the Beijing government's Integrated Circuit Design and Test Fund.[685] According to Hua Capital's website, the ISSI acquisition "has important meaning for filling a void in China's memory storage industry, advancing automotive semiconductors, and maintaining the security of domestically produced smart cards."[686]

- Beijing E-Town: The investment funds in the consortium are all connected through investment from Beijing E-Town, which is part-owner of one of the consortium members (eTown MemTek). Beijing E-Town invested CNY 300 million ($49 million) in SummitView Pujiang on December 15, 2014, for a 20.03 percent stake in the CNY 1.5 billion ($243 million) fund.[687] Likewise, Beijing E-Town invested CNY 200 million ($32 million) in the Hua Capital-managed Beijing Integrated Circuit Design and Test Fund on September 25, 2014, for an 8.96 percent stake in the CNY 2.232 billion ($362 million) fund.[688] Beijing E-Town gave Huaqing Jiye – the only "private" company in the consortium – a CNY 247 million ($39 million) 2-year loan on November 20, 2015, in relation to the acquisition of ISSI.[689] The acquisition was also supported by debt financing from Chinese state-owned commercial banks.

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[681] *Shanghai Establishes IC Industry Development Leading Small Group* [Chinese], SUMMITVIEW Aug. 18, 2015, http://www.summitviewcapital.com/plus/view.php?aid=27.
[682] *Provisional Measures on the Administration of the Shanghai Venture Capital Guiding Fund*, art.1 (Shanghai Municipal Government, Hu Fu Fa [2010] No. 37, issued Oct. 26, 2010).
[683] *Founding Partners* [Chinese], SUMMITVIEW, http://www.summitviewcapital.com/plus/list.php?tid=16, (last visited Nov. 3, 2017).
[684] *Company Profile* [Chinese], HUA CAPITAL, http://www.hua-capital.com/about.aspx?id=609, (last visited Nov. 3, 2017).
[685] Integrated Silicon Solutions, Inc. Schedule 14A filed with the SEC: Uphill Investment Co. Merger Proposal, Special Meeting of Stockholders [Chinese], June 19, 2015, (slide 10).
[686] *News* [Chinese], HUA CAPITAL, http://www.hua-capital.com/ne_ws.aspx, (last visited Nov. 3, 2017).
[687] BEIJING E-TOWN INTERNATIONAL INVESTMENT AND DEVELOPMENT CO., LTD. 2016 PUBLIC BOND ISSUANCE COLLECTION MANUAL ABSTRACT 1-2-64 [Chinese] (July 14, 2016).
[688] BEIJING E-TOWN INTERNATIONAL INVESTMENT AND DEVELOPMENT CO., LTD. 2016 PUBLIC BOND ISSUANCE COLLECTION MANUAL ABSTRACT 1-2-65 [Chinese] (July 14, 2016).
[689] BEIJING E-TOWN INTERNATIONAL INVESTMENT AND DEVELOPMENT CO., LTD. 2016 PUBLIC BOND ISSUANCE COLLECTION MANUAL ABSTRACT 1-2-101 [Chinese] (July 14, 2016).

Industrial and Commercial Bank of China, in conjunction with the Bank of Beijing and Beijing Rural Commercial Bank, reportedly provided the consortium with a $480 million loan, with a five-year term.[690]

Seagull/Omnivision

On January 28, 2016, Seagull International Ltd. and Seagull Acquisition Corp. (collectively, Seagull) announced the completion of the acquisition of OmniVision Technologies, Inc. (OmniVision) for approximately $1.9 billion.[691] OmniVision is a leading developer of advanced digital imaging solutions. The company's CameraChip™ and CameraCubeChip™ products are highly integrated, single-chip complementary metal-oxide semiconductor (CMOS) image sensors for consumer and commercial applications.[692]

Seagull is a consortium composed of Hua Capital, CITIC Capital Holdings Limited (CITIC Capital), and Goldstone Investment Co., Ltd. (Goldstone). These investment funds are backed by state capital and claim to pursue state objectives. CITIC Capital is partly owned by CITIC Group,[693] which describes itself as "a large state-owned multinational conglomerate."[694] CITIC Capital's investment capital comes primarily from China's sovereign wealth funds and pension funds.[695] Goldstone, which is a wholly-owned subsidiary of CITIC Securities,[696] stated in regulatory filings that the OmniVision investment fulfills Goldstone's objective of providing both a financial return and advancing the development of China's national integrated circuit

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[690] *Banks Provide $480 Million Loan, Assist Chinese Financial Consortium Acquire ISSI* [Chinese], REUTERS, Dec. 15, 2015.

[691] Omnivision & Hua Capital Management, Citic Capital and Goldstone Investment Announce the Completion of the Acquisition of Omnivision by Hua Capital Management, Citic Capital and Goldstone Investment, OmniVision Exhibit 99.1. filed with the SEC, Jan. 28, 2016. *See also Beijing Ingenic Swallows U.S.'s OmniVision* [Chinese], CAIXIN, Mar. 9, 2017, http://opinion.caixin.com/2017-03-09/101064177.html (last visited Nov. 3, 2017).

[692] Omnivision & Hua Capital Management, Citic Capital and Goldstone Investment Announce the Completion of the Acquisition of Omnivision by Hua Capital Management, Citic Capital and Goldstone Investment, OmniVision Exhibit 99.1. filed with the SEC, Jan. 28, 2016. *See also* OmniVision's camera sensors have been used in Apple's iPhone. *Hua Capital hires Bank of America for OmniVision deal*, SOUTH CHINA MORNING POST, Sept. 19, 2014.

[693] CITIC Group owns a 24.06 percent stake in CITIC Capital. CITIC 2015 ANNUAL REPORT 314 (2016).

[694] See *Brief Introduction*, CITIC GROUP CORPORATION, http://www.group.citic/wps/portal/!ut/p/b1/04_Sj9CPykssy0xPLMnMz0vMAfGjzOI9w8zcLULdQoM9XV1MDRxNXL283H09DE1cjPQLsh0VAc_K3bQ!/?lctn=1&flag=11 (last visited Jan. 9, 2018) ("CITIC Group was established in 1979 by Mr. Rong Yiren with the support of late Chinese leader Deng Xiaoping. Since its inception, CITIC Group has been a pilot for national economic reform and an important window on China's opening to the outside world. It has blazed a new trail of development for China's Reform and Opening-up by raising foreign capital, *introducing advanced technologies*, and adopting advanced international practice in operation and management, thus building up good reputation both home and abroad" (emphasis added).).CITIC Limited (SEHK: 00267) is one of the largest constituents of the Hang Seng Index. As of December 31, 2016, CITIC Limited had total assets of HK$7,238 billion ($934 million), total revenue of HK$381 billion ($49.1 billion), and total equity attributable to ordinary shareholders of HK$431 billion ($55.6 billion).

[695] *Ingenic Semiconductor Co. Stock Issuance and Cash Payment to Purchase Assets and Raise Accompanying Capital as well as Affiliated Transaction Contingency Plan* 27 [Chinese] filed with the Shenzhen Stock Exchange in Nov. 2016.

[696] OmniVision Exhibit 99.1. Omnivision & Hua Capital Management, Citic Capital and Goldstone Investment Announce The Completion Of The Acquisition Of Omnivision By Hua Capital Management, Citic Capital and Goldstone Investment, SEC, filed Jan. 28, 2016.

industry.[697] Hua Capital, which manages the Beijing government's Integrated Circuit Design and Test Fund, "actively looks for outstanding IC design and test companies to execute acquisitions."[698] Hua Capital states on its website that not only will the OmniVision acquisition provide a return to investors, but it will also effectively advance the development of China's semiconductor industry.[699]

The investment funds in the consortium provided two-thirds of the $1.9 billion purchase price, with state-owned banks providing the remaining one-third of the purchase price. A consortium of Chinese finance entities contributed $1.1 billion, while the state-owned Bank of China (Macao Branch) and China Merchants Bank (New York branch) provided loans of $800 million.[700] Bank of America and China's sovereign wealth fund, CIC, advised the Chinese consortium on the transaction.[701]

c) *Information Technology*

Government Policies

The IT sector has long been a focus of Chinese development policy. The *11th Five-year Plan*, *12th Five-year Plan*, and *13th Five-year Plan* have all emphasized the development of China's IT sector. MIIT issued the IT sector specific plans including the *Information Industry 11th Five-year Plan*[702] during the 11th (2006-2010) Five-year Plan period, the *Telecom Industry 12th Five-year Plan*[703] during the 12th (2011-2015) Five-year Plan period, and the *Information Industry Development Guidelines* (*IT Development Guidelines*)[704] during the 13th (2016-2020) Five-year Plan period. The 2016 *IT Development Guidelines* call for "IT industry backbone enterprises to launch overseas acquisitions through acquiring bills, acquiring funds, acquiring debt etc."[705]

The Chinese government has issued other policies, plans, and decisions that focus on the IT sector. For instance, in 2009, the State Council's *Electronic Information Industry Restructuring and Revitalization Plan* identified information technology as an important driving force of the global economy and pointed to the strategic, foundational, and guiding role of the IT sector.[706]

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[697] Press Release, Ingenic Semiconductor Co. Stock Issuance and Cash Payment to Purchase Assets and Raise Accompanying Capital as well as Affiliated Transaction Contingency Plan 28 [Chinese] (Nov. 2016), filed with the Shenzhen Stock Exchange.
[698] Press Release, Ingenic Semiconductor Co. Stock Issuance and Cash Payment to Purchase Assets and Raise Accompanying Capital as well as Affiliated Transaction Contingency Plan 26-7 [Chinese] (Nov. 2016), filed with the Shenzhen Stock Exchange.
[699] *News* [Chinese], HUA CAPITAL, http://www.hua-capital.com/news.aspx (last visited Nov. 3, 2017).
[700] *Beijing Ingenic Swallows U.S.'s OmniVision* [Chinese], CAIXIN, Mar. 9, 2017, http://opinion.caixin.com/2017-03-09/101064177.html (last visited Nov. 3, 2017).
[701] Press Release, OmniVision, OmniVision To Be Acquired By Hua Capital Management, CITIC Capital and Goldstone Investment for $29.75 Per Share in Cash (Apr. 30, 2015).
[702] *Information Industry 11th Five-year Plan* (MIIT, published Oct. 30, 2008).
[703] *Telecom Industry 12th Five-year Development Plan* (MIIT, published June 27, 2013).
[704] *Information Industry Development Guidelines* (MIIT and NDRC, Gong Xin Bu Lian Gui [2016] No. 453, issued Jan.16, 2017).
[705] *Information Industry Development Guidelines*, Section 5(3) (MIIT and NDRC, Gong Xin Bu Lian Gui [2016] No. 453, issued Jan.16, 2017).
[706] *Electronic Information Industry Restructuring and Revitalization Plan*, preamble (State Council, published Apr. 15, 2009).

In 2010, the State Council's *SEI Decision* identified new-generation information technology as a strategic emerging industry.[707] In 2011, the State Council's *Notice on Issuing Several Policies on Further Encouraging the Development of the Software and Integrated Circuit Industries*, called for supporting the "Going Out" strategy of enterprises in establishing foreign marketing networks and R&D centers to promote IC, software, and IT service exports.[708]

These government policies and plans call for a particular focus on developing core foundational industries, such as new displays, high-end software, and high-end servers.[709] To develop these technologies, they call for government-industry collaboration, the pursuit of indigenous innovation, and "international cooperation."[710] In particular, these plans call for support of domestic IC, software, telecom, and new display enterprises that are implementing the "Going Out" strategy in the form of acquisitions or equity investment in foreign information technology companies to strengthen international competitiveness.[711] The plans also call for government-directed investment in the IT industry,[712] and for financial organizations to support outbound investment.[713]

In 2015 Premier Li Keqiang introduced the *"Internet Plus" Action Plan*, which calls for the integration of the Internet into every aspect of the Chinese economy and society. In particular, in the section titled "Expanding Foreign Cooperation," the plan calls for competitive Chinese enterprises to "go out" in groups, via foreign acquisitions, in order to increase their global competitiveness in this area.[714] The NDRC, Ministry of Foreign Affairs, MIIT, MOFCOM, and Cyberspace Administration of China are responsible for supporting this effort.[715]

[707] *SEI Decision* § 3(2).
[708] *Notice on Issuing Several Policies on Further Encouraging the Development of the Software and Integrated Circuit Industries* § 4(21) (State Council, Guo Fa [2011] No. 4, issued Jan. 28, 2011).
[709] *SEI Decision* § 3(2).
[710] *Electronic Information Industry Restructuring and Revitalization Plan* § 2(2) (State Council, published Apr. 15, 2009).
[711] *Electronic Information Industry Restructuring and Revitalization Plan* § 4(5) (State Council, published Apr. 15, 2009).
[712] *Electronic Information Industry Restructuring and Revitalization Plan* § 4(4) (State Council, published Apr. 15, 2009). *Notice on Issuing Several Policies on Further Encouraging the Development of the Software and Integrated Circuit Industries* § 2(12) (State Council, Guo Fa [2011] No. 4, issued Jan. 28, 2011).
[713] *Electronic Information Industry Restructuring and Revitalization Plan* § 4(5) (State Council, published Apr. 15, 2009).
[714] *Guiding Opinions on the Active Promotion of "Internet +" Action* § 3(4.1) (State Council, Guo Fa [2015] 40, issued July 04, 2015).
[715] *Guiding Opinions on the Active Promotion of "Internet +" Action* § 3(4.1) (State Council, Guo Fa [2015] 40, issued July 04, 2015).

Likewise, in 2016, the Chinese government released a wave of IT-related plans and policies,[716] several of which encourage foreign acquisitions as a means of obtaining technology.[717] For instance, the *Software and Information Technology Services Development Plan (2016-2020)* encourages the use of the "public-private partnership" model, wherein public and private capital cooperate, as well as the mobilization of financial services in support of foreign acquisitions.[718]

Three transactions that reflect and exemplify the impact of these policies are discussed below.

Chinese Investments in the U.S. Information Technology Sector

Ant Financial/EyeVerify

In September 2016, Alibaba's Ant Financial Services Group (Ant Financial) acquired 100 percent of U.S.-based EyeVerify Inc. (EyeVerify), for an undisclosed amount[719] (Bloomberg reported a transaction value of $70 million).[720] EyeVerify is a creator of biometric verification technology. EyeVerify's patented authentication solution uses existing cameras on smartphones to image and pattern match the blood vessels in the whites of the eye. The application protects data with a high entropy encryption key which is equivalent to a 50-character complex password.[721]

Government investment and financing was crucial to this transaction. Five months before the acquisition, in April 2016, China's sovereign wealth fund, CIC, and CCB Trust, a subsidiary of state-owned China Construction Bank, each leading a consortium, participated in a $4.5 billion series B investment in Ant Financial as new strategic investors.[722] CIC and CCB Trust were joined by existing Ant Financial shareholders, including state-owned China Life and other leading Chinese insurance companies, state-owned China Post Group, China Development Bank Capital, a wholly-owned subsidiary of the state-owned policy bank, and Primavera Capital Group.[723] In addition to the state-funding in the Series B described above, China's National

[716] *Big Data Industry Development Plan (2016-2020)* (MIIT, Gong Xin Bu Gui [2016] No. 412, issued Dec. 18, 2017); *Information and Industry Integration Development Plan (2016-2020)* (MIIT, Gong Xin Bu Gui [2016] 333, issued Nov. 3, 2016); *Information and Communications Industry Development Plan (2016-2020)* (MIIT, Gong Xin Bu Gui [2016] No. 424, issued Dec. 18, 2016); *Software and Information Technology Services Development Plan (2016-2020)* (MIIT, Gong Xin Bu Gui [2016] No. 425, issued Dec. 18, 2016); *13th Five-year Transportation and Shipping Informatization Development Plan* (Ministry of Transportation, Jiao Gui Hua Fa [2016] 74, issued Apr. 19, 2016); *13th Five-year Transportation Science and Technology Development Plan* (Ministry of Transportation, Jiao Ke Ji Fa [2016] 51, issued Mar. 16, 2016).

[717] *See e.g.., Information and Communications Industry Development Plan (2016-2020)* § 3(2)6 (MIIT, Gong Xin Bu Gui [2016] No. 424, issued Dec.18, 2016).

[718] *See Software and Information Technology Services Development Plan (2016-2020)* § 5(3) (MIIT, Gong Xin Bu Gui [2016] No. 425, issued Dec. 18, 2016).

[719] Press Release, EyeVerify, Ant Financial Acquires EyeVerify to Boost Trust, Security, and Convenience of Mobile Financial Transaction (Sept. 13, 2016).

[720] *Alibaba Finance Arm Buys Eye-Scan Startup in First U.S. Foray*, BLOOMBERG, Sept. 13, 2016.

[721] Press Release, BioConnect and EyeVerify Collaborate to Improve Identity and Authentication in Financial Sector (Aug. 30, 2016).

[722] Press Release, Ant Financial, Ant Financial Closes $4.5bn Series B Financing (Apr. 26, 2016).

[723] Press Release, Ant Financial, Ant Financial Closes $4.5bn Series B Financing (Apr. 26, 2016).

Social Security Fund acquired a 5 percent stake in Ant Financial through a previous Series A round.[724]

According to Ant Financial's series B press release, Ant Financial's "strategic partnership with China Investment Corp Capital will support its continued push into international markets." In addition, the press release notes that the "capital raised in the Series B round will be invested partly in further development of the company's cloud computing infrastructure and biometric verification technologies."[725]

Apex/Lexmark

On November 29, 2016, Lexmark International, Inc. (Lexmark) announced the completion of its acquisition by a consortium of investors led by Apex Technology Co., Ltd. (Apex) and PAG Capital for $3.6 billion.[726] Lexmark manufactures and sells primarily laser printers and toner cartridges.[727] Prior to the acquisition, the National IC Fund invested CNY 569 million ($86 million) in Apex.[728]

The Chinese consortium paid well over Lexmark's market capitalization of about $2.2 billion. Various other printer companies including Canon, Konica Minolta, and Ricoh are said to have considered acquiring Lexmark.[729] The largest shareholder (at nearly 70 percent)[730] in Apex is Ninestar (also known as Zhuhai Seine Technology Co., Ltd.), a company which a U.S. court found in 2012 had imported patent-infringing printer cartridges into the United States "deliberately and in bad faith."[731]

In its 2015 Annual Report, Apex noted the guiding influence of the *Electronics Information Manufacturing Industry 12th Five-year Development Plan* and the *IC Industry 12th Five-year Development Plan*.[732] Apex also pointed to the encouragement in the State Council's 2009

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[724] *Alibaba Arm Ant Financial Completes Private Placement of Shares*, REUTERS, July 3, 2015.
[725] Press Release, Ant Financial, Ant Financial Closes $4.5bn Series B Financing (Apr. 26, 2016).
[726] Press Release, Lexmark, Lexmark Announces Completion of Acquisition by Apex Technology and PAG Asia Capital (Nov. 29, 2016).
[727] *Technology Hardware, Storage and Peripherals – Company Overview of Lexmark International, Inc.*, BLOOMBERG (last visited Nov. 20, 2017) ("Lexmark International, Inc., together with its subsidiaries, operates as a developer, manufacturer, and supplier of printing, imaging, device management, managed print services (MPS), document workflow, and business process and content management solutions worldwide. It operates through two segments, Imaging Solutions and Services (ISS), and Enterprise Software. The ISS segment offers a portfolio of color and monochrome laser printers, laser multifunction products, and dot matrix printers, as well as various cartridges, service parts, and other supplies for use in the installed base of laser, inkjet, and dot matrix printers. It also provides maintenance, consulting, and systems integration services, as well as MPS offerings, such as asset lifecycle management, implementation and decommissioning services, consumables management, remote device monitoring and management, and business process optimization services.").
[728] Zhejiang Wansheng Co., *Zhejiang Wansheng Co., Ltd. Public Notice In Response to a Letter from the Shanghai Stock Exchange Requesting Information Disclosure Regarding the Company's Issuance of Shares to Acquire Assets and Raise Supporting Funds in a Related Party Transaction* [Chinese] (Code 603010, Public Notice 2017-042).
[729] Charles Brewer, *Apex Closes Lexmark Deal; Up Next, HP's Acquisition of Samsung's Printer Biz*, ENX MAGAZINE, Dec. 27, 2016.
[730] ZHUHAI APEX TECHNOLOGY CO., LTD. 2016 ANNUAL REPORT 72 [Chinese] (2016).
[731] Ninestar Tech. Co. v. ITC, 667 F.3d 1373 (Fed. Cir. 2012).
[732] ZHUHAI APEX TECHNOLOGY CO., LTD. 2015 ANNUAL REPORT SUMMARY 5-6 [Chinese] (2016).

Electronic Information Industry Restructuring and Revitalization Plan for outstanding enterprises to "go out" and acquire high-tech foreign enterprises to strengthen their international competitiveness.[733]

Genimous/Spigot

In May 2016, China-based Genimous Investment Co., Ltd. (Genimous), formerly a manufacturer of electronics products, acquired 100 percent of Spigot Inc. (Spigot), a U.S.-based digital marketing company, for over $250 million.[734] Genimous was able to complete this transaction despite having recorded a net loss, after deducting income from any non-recurring gain or loss, of CNY 40 million ($6 million) in 2015; that year, it collected only CNY 318 million ($51 million) in revenue, CNY 55 million ($9 million) less than in 2014.[735] Spigot is one of the world's leading digital performance-based marketing companies.[736] According to its website, Spigot's "proprietary technology platform marries the power of big-data with the flexibility of self-training algorithms to produce rapid, hyper-optimized results for clients."[737]

The fact that the Genimous acquisition of Spigot conformed to Chinese industrial policy appears to have been instrumental in securing regulatory approval for the acquisition. In response to a China Securities Regulatory Commission inquiry about the transaction, Genimous explained that in accordance with the *Henan Province Provisional Measures on the Administration of Foreign Investment Projects*, foreign investments under $300 million are managed by the Henan Province Development and Reform Commission (Henan DRC). After it was determined that the acquisition fell within the "encouraged" industries of the *Guiding Catalogue of Foreign Investment Industries*, the Henan DRC issued the *Notice Regarding Genimous Investment Ltd., Co. Acquisition in the U.S. of Spigot, Inc.*, which approved the acquisition.[738]

From its founding in 1996, Genimous manufactured and sold electronic products.[739] Following the Spigot transaction, Genimous radically changed its business model, shifting its focus from the manufacture of electronic products to the mobile Internet software industry.[740]

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[733] ZHUHAI APEX TECHNOLOGY CO., LTD. 2015 ANNUAL REPORT SUMMARY 5-6 [Chinese] (2016).
[734] GENIMOUS INVESTMENT CO., STOCK ISSUANCE AND CASH PAYMENT TO PURCHASE ASSETS AND RAISE THE ACCOMPANYING CAPITAL AND AFFILIATED TRANSACTION REPORT 1-1-5 [Chinese] (Apr. 2016).
[735] GENIMOUS INVESTMENT CO. 2016 ANNUAL REPORT 7-8 [Chinese] (2017).
[736] GENIMOUS INVESTMENT CO., STOCK ISSUANCE AND CASH PAYMENT TO PURCHASE ASSETS AND RAISE THE ACCOMPANYING CAPITAL AND AFFILIATED TRANSACTION REPORT 1-1-855 [Chinese] (Apr. 2016).
[737] SPIGOT (Dec. 13, 2017), https://www.spigot.com/.
[738] Genimous applied for approval from the Zhengzhou High-Tech Industrial Development Park, which determined that the acquisition fell within the "encouraged" industries of the *Guiding Catalogue of Foreign Investment Industries*, and subsequently submitted the application materials to the Zhengzhou Development and Reform Commission (Zhengzhou DRC) on November 6, 2015. On November 12, 2015, the Zhengzhou DRC consented to the foreign investment project. On November 24, 2015, the Henan DRC issued the *Notice Regarding Genimous Investment Ltd., Co. Acquisition in the U.S. of Spigot, Inc.*, which approved the acquisition. See GENIMOUS INVESTMENT LTD., CO. RESPONSE TO FEEDBACK FROM "NOTICE ON CHINA SECURITIES REGULATORY COMMISSION'S ADMINISTRATIVE PERMIT PROJECT INVESTIGATION SECOND FEEDBACK OPINIONS" 1-1-54 [Chinese] [152981] , REVISED VERSION (Dec. 2015).
[739] GENIMOUS INVESTMENT CO., STOCK ISSUANCE AND CASH PAYMENT TO PURCHASE ASSETS AND RAISE THE ACCOMPANYING CAPITAL AND AFFILIATED TRANSACTION REPORT 1-1-151 [Chinese] (Apr. 2016).
[740] GENIMOUS INVESTMENT CO., STOCK ISSUANCE AND CASH PAYMENT TO PURCHASE ASSETS AND RAISE THE ACCOMPANYING CAPITAL AND AFFILIATED TRANSACTION REPORT 1-1-156 [Chinese] (Apr. 2016).

Genimous cites several Chinese government policies and plans in connection with this strategic shift and its acquisition of Spigot. For instance, in Genimous's stock issuance and major transaction disclosure, the company points to government policies that support the development of the mobile Internet and encourage leading Chinese internet enterprises to expand into the international market, as background for the acquisition.[741] Genimous's acquisition of Spigot closely mirrors this policy directive. According to Genimous, the purpose of the acquisition of Spigot was to acquire quickly foreign technology, human capital, brand, and revenue channels,[742] and help Genimous expand into international markets.[743]

d) Biotechnology

Government Policies

The Chinese government has actively directed and supported the acquisition of biotechnology, which is an important component of advanced agricultural technology and medical technology.[744] The emphasis of these policies has shifted over time, from enhancing food security and medical services to advanced manufacturing of biotechnology products.

A series of five-year plans specifically targets biotechnology. These include the *"12th Five-year" Biotechnology Development Plan*,[745] the *"13th Five-year" Biological Industry Development Plan*[746] (which was issued pursuant to the *13th Five-year Plan* and the *"13th Five-year" National Strategic Emerging Industry Development Plan*), and the *"13th Five-year" Biotechnology Innovation Special Plan*[747] (pursuant to the *13th Five-year Plan* and the *"13th Five-year" Plan for Technology Innovation*).

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[741] GENIMOUS INVESTMENT CO., STOCK ISSUANCE AND CASH PAYMENT TO PURCHASE ASSETS AND RAISE THE ACCOMPANYING CAPITAL AND AFFILIATED TRANSACTION REPORT 1-1-155 [Chinese] (Apr. 2016). The company cites a range of policies, including the *National Focused Support for High-Tech Areas* (2008); the *Electronic Information Industry Reorganization and Revitalization Plan* (2009); the *IT Industry "Five-year" Development Plan* (2012); the *Guiding Catalogue of Industrial Structure Adjustment* (2011); and the *Internet Plus Action Plan* (2015), which called for the promotion of the mobile internet and big data, while instructing leading internet companies to expand into the international market.

[742] GENIMOUS INVESTMENT CO., STOCK ISSUANCE AND CASH PAYMENT TO PURCHASE ASSETS AND RAISE THE ACCOMPANYING CAPITAL AND AFFILIATED TRANSACTION REPORT 1-1-104 [Chinese] (Apr. 2016).

[743] GENIMOUS INVESTMENT CO., STOCK ISSUANCE AND CASH PAYMENT TO PURCHASE ASSETS AND RAISE THE ACCOMPANYING CAPITAL AND AFFILIATED TRANSACTION REPORT 1-1-157 [Chinese] (Apr. 2016).

[744] In agriculture, genetically modified (GM) seed varieties can improve food security, output and production, and increase exports. *See* USAID, ABSP II & PROGRAM FOR BIOSAFETY SYSTEMS, BRIEF #1: WHAT IS AGRICULTURAL BIOTECHNOLOGY? (2004) (stating that biotechnology in medicine includes biological diagnostics and treatment, such as genetic analysis and gene therapy); *see also* Albert Sasson, MEDICAL BIOTECHNOLOGY: ACHIEVEMENTS, PROSPECTS AND PERCEMPTIONS, UNITED NATIONS UNIVERSITY (Tokyo: 2005).

[745] *Notice on the "12th Five-year" Biotechnology Development Plan* (MOST, Guo Ke Fa She [2011] No. 588, issued Nov. 4, 2011).

[746] *National Development and Reform Commission Notice on Issuing the "13th Five-year" Biological Industry Development Plan* (NDRC, Fa Gai Gao Ji [2016] No. 2665, issued Dec. 20, 2016).

[747] *MOST Notice on Issuing the "13th Five-year" Biotechnology Innovation Special Plan* (MOST, Guo Ke Fa She [2017] No. 103, issued Apr. 24, 2017).

Collectively, these "Biotechnology Five-year Plans" direct Chinese enterprises to seek out advanced biotechnology overseas, through cooperation in research;[748] promoting international biotechnology transfer;[749] and promoting the acquisition of new products and "key technology" through mergers and acquisitions,[750] aided by government financial support.[751]

Other state planning documents articulate similar objectives. For instance, medical Five-year Plans and agricultural Five-year Plans underscore the need for advancing biotechnology[752] and promoting the use of foreign cooperation and acquisitions as a means of technology transfer.[753] The biopharmaceutical sector is also a major target of the Made in China 2025 policy.[754]

The effect of these policies is evident in recent acquisitions of U.S. biotechnology firms. As discussed below, both Chinese SOEs and private enterprises have undertaken acquisitions in this sector to meet government objectives. Government financial support – including direct grants, state-backed investment funds, and debt financing by state-run policy banks – continues to play a key role in enabling these transactions.

Chinese Investments in the U.S. Biotechnology Sector

China National Chemical Corp./Syngenta AG

The acquisition of Swiss-based Syngenta by the China National Chemical Corp. (ChemChina) in May 2017 is the largest acquisition or merger ever completed by a Chinese enterprise, with a final price of $43 billion on May 18, 2017.[755] Through this acquisition, ChemChina gained access to a long list of patented genetically modified (GM) seed, agriculture, and biotech products cited as targets in Five-year Plans.[756] ChemChina also obtained Syngenta's entire U.S.

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[748] *Notice on the "12th Five-year" Biotechnology Development Plan* § 5(6) (MOST, Guo Ke Fa She [2011] 588, issued on Nov. 4, 2011).
[749] *MOST Notice on Issuing the "13th Five-year" Biotechnology Innovation Special Plan* § 5(6).
[750] *National Development and Reform Commission Notice on Issuing the "13th Five-year" Biological Industry Development Plan §* 8(4).
[751] *National Development and Reform Commission Notice on Issuing the "13th Five-year" Biological Industry Development Plan §* 7(3).
[752] *"12th Five-year" Agricultural Science and Technology Development Plan* § 3(1)2 (MOA, posted online Dec. 26, 2011); *Notice on Issuing the "13th Five-year" Agricultural and Rural Science and Technology Innovation Special Plan* § 4(2), Special Box 7 (MOST, Ministry of Agriculture, Ministry of Education, MIIT, Ministry of Land and Resources, Ministry of Environmental Protection, Housing Urban and Rural Construction Department, Ministry of Water Resources, SASAC, AQSIQ, State Forestry Administration, Chinese Academy of Sciences, China Meteorological, Administration, National Food Administration, State Oceanic Administration, Supply and marketing cooperatives, Guo Ke Fa Nong [2017] No. 170, issued June 9, 2017); *MOA Notice on Issuing the "13th Five-year" Agriculture Science and Technology Development Plan* § 1 ¶ 2 (MOA, Nong Ke Jiao Fa [2017] No. 4, issued Jan. 25, 2017); the accelerating speed of biotechnology development is also cited as a reason for issuing the *Ministry of Science and Technology Office Notice on Issuing "13th Five-year" Medical Machinery Science and Technology Innovation Special Plan* § 1(2) (MOST, Guo Ke Ban She [2017] No. 44, May 26, 2017).
[753] *"12th Five-year" Agricultural Science and Technology Development Plan* § 3(1)5 (MOA, posted online Dec. 26, 2011); *Ministry of Science and Technology Office Notice on Issuing "13th Five-year" Medical Machinery Science and Technology Innovation Special Plan* § 1(1) § 5(2).
[754] *Made in China 2025 Roadmap* § 10(1).
[755] Syngenta AG, *Ex-99 (A)* 13 (May 23, 2016), on file with the SEC..
[756] *"12th Five-year" Agricultural Science and Technology Development Plan* §§ 3(1)2 (MOA, posted online Dec. 26, 2011); *Notice on Issuing the "12th Five-year" Agricultural and Rural Science and Technology Development*

business, including over 4,000 employees, 33 research sites, and 31 production and supply sites.[757]

ChemChina is an SOE, and the transaction is directly linked to the "Going Out" strategy, as reported by *Xinhua News*.[758] As a result of this transaction, two ChemChina executives who are also CCP officials – Ren Jianxin and Chen Hongbo – were appointed to the Syngenta board of directors, with Ren Jianxin named as chairman of the board.[759] The transaction was financed in large part by loans from a consortium of Chinese state-run policy banks, municipal policy banks, private banks, bonds issued to special purpose vehicles backed by state-owned commercial and policy banks and the China Reform Holdings Corporation.[760] This financing was made available even though a 2016 credit report on the ChemChina Group reported a debt-to-capital ratio of 74.78 percent.[761]

Beijing Genomics Institute/Complete Genomics

In January 2013, Beijing Genomics Institute (BGI) acquired Complete Genomics for $117 million.[762] Through the acquisition, BGI gained access to Complete Genomics' "gene sequencing equipment intellectual property rights, and the development of domestic equipment production"[763] – technology that the Chinese government has targeted in related sectoral Five-year Plans.[764] In fact, NDRC featured the BGI acquisition of Complete Genomics in its report on

Plan §§ 2(4), 3(2)1 (MOST, Ministry of Agriculture, Ministry of Education, Ministry of Water Resources, Housing and Urban-Rural Development, Ministry of Land and Resources, AQSIQ, State Forestry Administration, Chinese Academy of Sciences, National Food Administration, China Meteorological Administration, State Oceanic Administration, National Federation of Supply and Marketing Cooperatives, issued Mar. 15, 2012); *Notice on Issuing the "13th Five-year" Agricultural and Rural Science and Technology Innovation Special Plan §* 4(2)1. In the aforementioned *Agriculture Five-year Plans*, the importance of developing GMO technology is not only for food security, but also for agricultural industrialization strategy. Gene technology in an agricultural context is also part of the biotechnology Five-year Plans. *MOST Notice on Issuing the "13th Five-year" Biotechnology Innovation Special Plan* § 4(2)5; *Notice on the "12th Five-year" Biotechnology Development Plan* § 4(3)2.

[757] SYNGENTA, 2016 ANNUAL REVIEW 26 (2016).

[758] *Financial Watch: Acquisition of Syngenta Obtains Approval Chinese Capital Hugs the Whole World's Resources for a Win-Win Strategy* [Chinese], XINHUA NEWS, 2017, *available at* http://www.gov.cn/xinwen/2017-04/06/content_5183844.htm.

[759] Syngenta AG, *Ex-99.(A)*, A-1 (May 23, 2016), on file with the SEC. Ren Jianxin is the chairman of the CCP Committee of ChemChina. Chen Hongbo is secretary of the Hubei Province Discipline Inspection Commission, which acts as the local version of the central level Commission responsible for implementing President Xi Jinping's anti-corruption drive. Syngenta AG, *Ex-99.(A)*, A-1 (May 23, 2016), on file with the SEC.

[760] Syngenta AG, Schedule 13D 12 (May 18, 2017), on file with the SEC.

[761] Dagong Global Credit Rating Co., Ltd., Tracking the Rating Announcement 1, 22 [Chinese] (Da Gong Bao SD [2016] No. 242).

[762] *Shenzhen Beijing Genomics Institute Completes Acquisition of the United States' Complete Genomics* [Chinese], GENOMICS Mar. 19, 2013, http://www.genomics.cn/news/show_news?nid=99461.

[763] Jiang Jiang, and Han Qi, NDRC INSTITUTE OF INDUSTRIAL ECONOMICS AND TECHNOLOGY ECONOMICS "12TH FIVE-YEAR" PERIOD GENE DETECTION INDUSTRY DEVELOPMENT REVIEW [Chinese] (Aug. 8, 2017), *available at* http://gjss.ndrc.gov.cn/zttp/xyqzlxxhg/201708/t20170802_856974.html.

[764] *Notice on Issuing the "13th Five-year" Agricultural and Rural Science and Technology Innovation Special Plan §* 4(2)1; *MOST Notice on Issuing the "13th Five-year" Biotechnology Innovation Special Plan §§* 4(1)1, 4(1)3, 4(2)1.

biopharmaceutical industry development during the 12th Five-year Plan period, under the section heading "overseas acquisitions begin to take shape."[765]

BGI has even been a major recipient of assistance from the state policy bank, CDB.[766] The Shenzhen municipal government has singled out BGI as a target of support in multiple government measures, including development of both an international and domestic outsourcing industry.[767] BGI has received local government grants from the Donghu New Technology Development Zone Management Committee Finance Bureau for its Complete Genomics subsidiary to develop a local Chinese production base of Complete Genomics sequencer machinery. [768]

Although BGI is privately-owned, it has operated at the center of China's gene research industry since participating in the Human Genome Project, and has evident links to the government. BGI leadership features multiple officials who held CCP and government positions before joining BGI.[769]

In a company press release, BGI states that, "after the acquisition of U.S. listed company Complete Genomics (CG), BGI rapidly achieved technology transformation and re-innovation" resulting in the development and production of new gene sequencer machines in 2015 and

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[765] Wang Xuegong, Zhu Jun, Zhong Qian, Li Qian, CHINA BIOPHARMACEUTICAL MANAGEMENT ASSOCIATION, REVIEW OF BIOPHARMACEUTICAL INDUSTRY DEVELOPMENT DURING THE 12TH FIVE-YEAR PLAN [Chinese] (Aug. 2, 2017), *available at* http://gjss.ndrc.gov.cn/zttp/xyqzlxxhg/201708/t20170802_856972.html.

[766] CDB officials have held up BGI as an example of a company that CDB supports. *Zheng Zhijie, Servicing Innovation Development with Development Type Finance* [Chinese], ECONOMIC DAILY Dec. 16, 2016. Zheng Zhijie is the Vice Party Secretary, Vice Chairman and President of CDB. *Leader Profiles – Zheng Zhijie* [Chinese], CDB, http://www.cdb.com.cn/gykh/ldbz/zzj (last visited Oct. 26, 2017). In 2010, BGI also received CNY 600 million ($89 million) in loans from CDB to help BGI purchase sequencing machinery from U.S.-based Illumina. The sequencing machines were installed in BGI's Hong Kong facility, putting BGI "on the path to become world's largest sequencing facility;" Illumina stated that this was the single largest order to date for its technology. Press Release, Illumina Inc., Acquisition Puts Beijing Genomics Institute on Path to Become World's Largest Sequencing Facility (Jan.12, 2010), *available at* https://www.illumina.com/company/news-center/press-releases/press-release-details.html?newsid=1374343. CDB Shenzhen Branch referred to BGI as a "[s]trategic emerging industry leading enterprise." *See China Development Bank Shenzhen City Branch Injects New Momentum into Upgrading 'Shenzhen Quality' Sustainability* [Chinese], SHENZHEN PRESS GROUP, Jan. 5, 2013, *available at* http://www.cbrc.gov.cn/shaanxi/docPcjgView/C4DDC24B06384D3CB47268D0DDDA18AC/600211.html, (last visited Oct. 26. 2017).

[767] *Shenzhen City Economic Trade and Informatization Commission Notice on Issuing the Shenzhen City Service Outsourcing Development Plan (2012-2015)* § 4(2)2 (Shenzhen City Trade and Informatization Commission, Jing Ji Mao Xin Xi Fu Wu Zi [2012] No. 43); *Shenzhen City People's Government Office Notice on Issuing Several Measures on Strengthening Enterprise Service Support of Strategic Emerging Industry Development (2012-2013 Annual)* §5(27) (Shenzhen City People's Government Office, Shen Fu Ban Han [2012] No. 169, issued Nov. 19, 2012); *Notice on Issuing Shenzhen National Innovation City Overall Plan (2008-2015)* §4(1)2(Shen Fu [2008] No. 201, issued Sept. 21, 2008).

[768] SHENZHEN BGI HOLDINGS CO., LTD , 2017 FIRST HALF ANNUAL REPORT 129, 138 [Chinese] (Aug. 2017), *available at* www.szse.cn/.

[769] At the management level, the Executive vice President and Director of Strategic Planning at BGI, Yanmei Zhu, used to be vice-director of the Yangpu District NDRC, and the Chairman and CEO of BGI Agriculture Group, Yonghong Mei, is currently also the director of the China National GeneBank, and previously held the position of Deputy Party Secretary and Mayor of Jining City. *About BGI/Leadership* [Chinese], BGI-Shenzhen, http://www.genomics.cn/en/navigation/show_navigation?nid=292 (last visited Nov. 1, 2017).

2016.[770] This achievement is attributed to "focusing on the 18th National Congress of the CCP[…] internal governance, foreign relations, and national defense, and governance of the Party, the nation, and the military."[771]

e) Industrial Machinery and Robotics

Government Policies

Developing advanced industrial machinery, including robotics with industrial applications, is an important policy goal of the Chinese government. Chinese authorities hope to increase productivity[772] at a time of increasing labor costs in China,[773] and are attempting to acquire advanced technology so that China can join the ranks of high-tech manufacturing economies by 2025.[774] By supporting acquisitions in machinery and robotics, Chinese authorities hope to gain access to advanced technology, and they see this technology as vital to meeting Made in China 2025 policy objectives with respect to the production of large aircraft,[775] auto manufacturing,[776] agricultural machinery,[777] and medical technology.[778]

Several state planning documents underscore the importance of obtaining technology for advanced industrial machinery – for instance, the *Robotics Five-year Plan*, the *Industry Technology Innovation Capacity Development Plan (2016-2020)*[779] (*Industry Five-year Plans*), and the recently released *Next-Generation Artificial Intelligence Development Plan*[780] (*AI Plan*).

As these documents make clear, a key strategy for the "transformation and upgrading" of these sectors is a combination of government support[781] and the use of mergers and acquisitions to gain access to foreign technology.[782] Authorities have made frequent use of this approach,

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[770] *BGI High-Throughput Gene Sequencer Debut "to Forge Ahead for Five-years" Large-Scale Achievements Exhibition* [Chinese], BGI (Oct. 11, 2017), http://www.genomics.cn/news/show_news?nid=105368 (last visited Nov. 1, 2017).
[771] *BGI High-Throughput Gene Sequencer Debut "to Forge Ahead for Five-years" Large-Scale Achievements Exhibition* [Chinese], BGI (Oct. 11, 2017), http://www.genomics.cn/news/show_news?nid=105368 (last visited Nov. 1, 2017).
[772] *Made in China 2025 Notice* § 2(3); *State Council Notice on Issuing the Next-Generation of Artificial Intelligence Development Plan* § 3(2) (State Council, Guo Fa [2017] No. 35, issued Aug. 20, 2017).
[773] *Made in China 2025 Notice*, Section 1(2); *Notice on Issuing Robotics Industry Development Plan (2016-2020)* § 1, ¶ 4 (MIIT, NDRC, MoF, Gong Xin Bu Lian Gui [2016] No. 109, issued Mar. 21, 2016).
[774] *Made in China 2025 Notice* § 1(3), § 2(1).
[775] *Made in China 2025 Notice* § 1(3). *See also* Zhejiang Wanfeng Technology Development Co. Ltd./Paslin Co.
[776] *Made in China 2025 Notice* § 3(6)2.
[777] *Made in China 2025 Notice* § 3(6)8.
[778] *Made in China 2025 Notice* § 3(6)2, § 3(6)10.
[779] *Ministry of Industry and Information Technology Notice on Issuing the Industry Technology Innovation Capacity Development Plan (2016-2020)* (MIIT, Gong Xin Bu Gui [2016] No. 344, issued Oct. 31, 2016).
[780] *State Council Notice on Issuing the Next-Generation of Artificial Intelligence Development Plan* § 3(2) (State Council, Guo Fa [2017] No. 35, issued Aug. 20, 2017).
[781] *Industry Five-year Plan* § 5(3); *AI Plan* § 4(1); *Robotics Five-year Plan* § 4(3).
[782] *Industry Five-year Plan* § 5(5); *AI Plan* § 4(3). The *Robotics Five-year Plan* § 4(6) also suggests government support for "international cooperation."; *State Council Guiding Opinion on Promoting International Capacity and Equipment Cooperation* § 46(35) (State Council, Guo Fa [2015] No. 30, issued May 13, 2015), also, § 4 of the same plan is wholly dedicated to improving "Going Out" capacity, and § 6 is dedicated to "Expanding Policy Support Intensity."

supporting transactions through grants, state-led policy bank debt financing, and financing through state-sponsored investment funds.

Chinese Investments in the U.S. Industrial Machinery and Robotics Sector

Zhejiang Wanfeng Technology Development Co. Ltd./Paslin Co.

The acquisition activities of Zhejiang Wanfeng Technology Development Co. (Wanfeng) illustrate the approach outlined above. In 2016, Wanfeng wholly acquired Paslin Co. (Paslin), a developer and manufacturer of "complex automated assembly and welding systems,"[783] for $302 million.[784] Paslin Co. produces advanced manufacturing robots used primarily in the assembly of automobiles.[785]

To support the acquisition, Shaoxing City provided CNY 300 million ($45 million) to the Wanfeng Acquisition Fund, which was able to raise a total of CNY 1 billion ($151 million) from Wanfeng and other public and private companies,[786] significantly reducing Wanfeng's own capital contribution to the acquisition. In an interview with a Chinese financial daily, Wanfeng Director Zhao Yahong attributed the Paslin acquisition to financial assistance from the Wanfeng Acquisition Fund.[787] Wanfeng is also a recipient of government assistance, including a total of CNY 73 million ($11 million) in government grants from a combination of dozens of central and local governments.[788]

Although a private company, Wanfeng cultivates close ties to government authorities. The company is part of a family conglomerate, and run by Chen Ailian,[789] a well-connected CCP member who served as a representative from Zhejiang Province at the 12th National People's Congress (NPC) in 2016,[790] where she proposed that the government establish a new China High-Tech Development Bank policy bank to provide "low-interest medium- and long-term loans" and "financial assistance" to enterprises in the high-tech manufacturing industry.[791] She is also currently a member of the Standing Committee of Shaoxing City's 8th People's

[783] *Our Company*, PASLIN, http://www.paslin.com/our-company/ (last visited Oct. 23, 2017).
[784] Liang Zhen, *Zhejiang Wanfeng Acquires US Robotics Maker Paslin*, CHINA DAILY, Apr. 20, 2016.
[785] *Milestones + History*, PASLIN, http://www.paslin.com/milestones-history/ (last visited Oct. 23, 2017).
[786] *Announcement on the 2016 Zhejiang Shaoxing Transformation and Upgrading Industry Fund Investment into Wan Feng Commercial Industry Merger and Acquisition Fund Project* [Chinese] (Shaoxing City Financial Bureau, issued Feb. 26, 2016).
[787] Xu Ning, *Foreign Mergers and Acquisitions Adhere to the Industrial Chain and Value Chain High-End Extensions* [Chinese], JINRONG SHIBAO Aug. 28, 2017, *available at* http://www.whjr.gov.cn/sinfo-2-36686-0.html (last visited Oct. 23, 2017).
[788] WANFENG AUTO WHEEL CO. LTD., 2016 ANNUAL REPORT 163-173 [Chinese] (Apr. 11, 2017), *available at* www.szse.com.
[789] WANFENG AUTO WHEEL CO. LTD., 2016 ANNUAL REPORT 61-2 [Chinese] (Apr. 11, 2017), *available at* www.szse.com. Wanfeng is owned jointly by Chen Ailian's husband, Wu Liangding, and her son, Wu Jie. Wu Liangding is the owner of Rifa Group, and Wu Jie is the President of Rifa Group, another large investment company.
[790] *Representative List, '92 Zhejiang Representatives Group'* [Chinese], NPC, http://www.npc.gov.cn/delegate/dbmd.action?id=b2 (last visited Oct. 28, 2017).
[791] *NPC Representative Chen Ailian: Establish the China High-Tech Development Bank* [Chinese], 2016 CCP and CPPCC Plenary Session Opinions, *available at* http://zt.ccln.gov.cn/2016lh/tian/39017.shtml (last visited Oct. 23, 2017).

Congress,[792] the same municipal government which, a year earlier, had chosen her company to lead a joint private-public partnership (PPP) investment fund, the Wanfeng Commercial Industry Merger and Acquisition Fund (Wanfeng Acquisition Fund).[793]

By acquiring Paslin, Wanfeng not only gained access to advanced robotics technology, but also supported the objective of the municipal government of Shaoxing City, Zhejiang Province, to build a new aircraft manufacturing hub in its jurisdiction. This acquisition was supported by substantial government funding. Shaoxing City began issuing policy directives as early as 2012 in support of developing the city as a center for developing aircraft and aerospace equipment manufacturing. For instance, the *Shaoxing City Development Strategic Emerging Industry Key Field Guiding Catalogue (2013-2015)* identified GA manufacturing as a key "emerging information industry" and aerospace equipment as an "advanced equipment manufacturing industry," and targeted both for investment and government support.[794] Likewise, in 2016, the *Shaoxing City "13th Five-year" Industry Development Plan* stated that developing the city as an aviation hub was an important way of developing an "urban industrial development zone"[795] in Shaoxing, and that such programs should be supported by government measures including establishing "industrial funds" and other "preferential policies."[796]

Shaoxing City found a willing partner in Wanfeng, which began construction of the Wanfeng Aviation Special Village in 2016.[797] Consistent with government policies, this site was designed to become a hub for aircraft and aerospace equipment manufacturing. The site was visited by representatives from the NDRC Planning Division in October 2016, and held up as an example of Zhejiang Province's efforts in "promoting transformation and upgrading of traditional manufacturing."[798]

Government authorities viewed Wanfeng's acquisition of Paslin as pivotal to developing the aviation hub. According to the Zhejiang Province Financial Office, government support for the acquisition is part of "activating a strategic industry," and plays a role in a larger Shaoxing City-Wanfeng joint strategy to develop the Wanfeng Jingyuan High-End Equipment Park through a jointly administered fund valued at CNY 1 billion.[799] Concurrent with financing the Paslin

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[792] *Shaoxing Municipality 8th People's Congress Standing Committee Member List* [Chinese], SHAOXING MUNICIPALITY, *available at* http://sxrd.sx.gov.cn/art/2017/4/17/art_14842_1115531.html (last visited Oct. 28, 2017).
[793] *Announcement on the 2016 Zhejiang Shaoxing Transformation and Upgrading Industry Fund Investment into Wan Feng Commercial Industry Merger and Acquisition Fund Project* [Chinese] (Shaoxing City Financial Bureau, issued Feb. 26, 2016).
[794] *Shaoxing City Government Office Forwards Economic and Information Commission Notice on Shaoxing City Development Strategic Emerging Industry Key Fields Guiding Catalogue (2013-2015)* (Shaoxing City Government Office, Shao Zheng Ban Fa [2012] No. 166, issued Dec. 14, 2012).
[795] *Shaoxing City "13th Five-year" Industry Development Plan* § 4(2), ¶ 8 (Shi Jing Xin Wei, posted June 30, 2016).
[796] *Shaoxing City "13th Five-year" Industry Development Plan* § 6(2).
[797] *Development Process* [Chinese], WANFENG AUTO HOLDING GROUP, http://www.wfjt.com/develop.php (last visited Oct. 30, 2017).
[798] *National Development and Reform commission Research Team Visits Wanfeng Auto* [Chinese], WANFENG AUTO HOLDING GROUP, http://www.wfjt.com/news-detail.php?id=971 (last visited Oct. 30, 2017).
[799] Zhejiang Shaoxing, *Three Ones' Highly Effectively Deploying Government Industry Funds 'Energy Storage' Effectiveness* [Chinese], ZHEJIANG PROVINCE FINANCIAL OFFICE (May 10, 2017), http://m.mof.gov.cn/czxw/201705/t20170509_2596548.htm (last visited Oct. 23, 2017).

acquisition, the fund forged plans to establish "three major functional zones for intelligent equipment, robotics, and R&D" inside the Wanfeng Jingyuan High-End Equipment Park, designed to form the "core of the Wanfeng Aviation Village." [800]

This transaction exemplifies China's IDAR approach to transferring foreign technology. Within one year of acquiring Paslin, Wanfeng has already invested CNY 800 million ($118 million) in developing high-end robotics manufacturing capacity – based on technology acquired from Paslin – in Shaoxing City.[801] The use of Paslin's robotic manufacturing technology is described in a Shaoxing City government report as an "important force in Shaoxing's, even Zhejiang's, future aviation manufacturing industry."[802] As Chen Ailian stated, "by going through overseas mergers and acquisitions, we can absorb advanced technology, obtain brand value and sales channels, enter the high-end market, and greatly enhance Shaoxing enterprises' position in global market competition."[803] In its *Report on Development of China's Outward Investment and Economic Cooperation 2016*, MOF explained that, through the Paslin acquisition, Wanfeng successfully "obtained key technology for the field of robotics."[804]

Northern Heavy Industries Group Co. Ltd./Robbins Co.

Northern Heavy Industries Group (NHI), an SOE owned by China's central government, acquired the Robbins Company (Robbins) through a "three-phase merger," beginning in 2016. [805] NHI first invested heavily in Robbins, then increased its stake to 61 percent, and intends to acquire a 100 percent stake in the future. [806] Through this transaction, NHI gained access to Robbins' manufacturing capacity with respect to "advanced, underground construction machinery."[807] As an SOE, NHI pursues state policy goals, including "the four upgrades (technological upgrades, market upgrades, management upgrades, and talent upgrades), and major equipment and high-end sets [of products]," which the company describes as "the major striking direction."[808] China Exim was the only bank that financed NHI's acquisition of

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[800] Zhejiang Shaoxing, *Three Ones' Highly Effectively Deploying Government Industry Funds 'Energy Storage' Effectiveness* [Chinese], ZHEJIANG PROVINCE FINANCIAL OFFICE (May 10, 2017), http://m.mof.gov.cn/czxw/201705/t20170509_2596548.htm (last visited Oct. 23, 2017).
[801] Zhejiang Zhaoxing, *Three Ones' Highly Effectively Deploying Government Industry Funds 'Energy Storage' Effectiveness* [Chinese], ZHEJIANG PROVINCE FINANCIAL OFFICE (May 10, 2017), http://m.mof.gov.cn/czxw/201705/t20170509_2596548.htm (last visited Oct. 23, 2017).
[802] Zhejiang Zhaoxing, *Three Ones' Highly Effectively Deploying Government Industry Funds 'Energy Storage' Effectiveness* [Chinese], ZHEJIANG PROVINCE FINANCIAL OFFICE (May 10, 2017),http://m.mof.gov.cn/czxw/201705/t20170509_2596548.htm (last visited Oct. 23, 2017).
[803] Wang Dandong, *Our City Introduces Encouraging Privately Operated Enterprise Going Out Three Year Action Plan for 12 Industry Leaders to Enter the List of Cultivated Multinational Companies* [Chinese], SHAOXING DAILY, July 25, 2017, *available at* http://www.sx.gov.cn/art/2017/7/25/art_126_1144927.html (last visited Oct. 23, 2017).
[804] MOFCOM, *Report on Development of China's Outward Investment and Economic Cooperation 2016* 148 (Dec. 2016).
[805] *About Us*, THE ROBBINS COMPANY, http://www.therobbinscompany.com/about/ (last visited Oct. 20, 2017). This is NHI's second significant acquisition in the high-tech tunnel boring machinery field, following on the acquisition of NFM Technologies of France. In a similar "three-stage merger" pattern, NHI first acquired 70 percent of NFM Technologies in 2007, and increased its ownership stake to 100 percent in 2011. *History*, NFM TECHNOLOGIES, http://www.nfm-technologies.com/-History-.html (last visited Nov. 1, 2017).
[806] *About Us*, THE ROBBINS COMPANY, http://www.therobbinscompany.com/about/ (last visited Oct. 20, 2017).
[807] *About Us*, THE ROBBINS COMPANY, http://www.therobbinscompany.com/about/ (last visited Oct. 20, 2017).
[808] *Group Introduction* [Chinese], NHI, http://www.china-sz.com/jituanjianjie/ (last visited Oct. 20, 2017).

Robbins,[809] and China Exim identified the acquisition as an "important project"[810] and an "international industrial capacity cooperation" project.[811] As such, the transaction qualified for China Exim's "Two Preferential" loan programs, which generally provide financing on below-market terms.[812]

Midea Group Co., Ltd./Kuka AG (2017)

In 2017 the Midea Group Co., Ltd. (Midea) bought €3.7 billion ($4.2 billion) worth of shares to expand its original 13.51 percent share in Kuka AG (Kuka) to 94.55 percent.[813] Kuka AG is based in Germany, but has substantial assets in the United States.[814] Midea explained that the transaction would promote "transformation and upgrading,"[815] noting that by "taking KUKA as a platform, we will continue the layout of industrial robots, commercial robots, service robots and artificial intelligence, and actively develop key components in the field of industrial automation."[816]

Although Midea is privately owned,[817] the acquisition relied on financing from a consortium of banks headed by Chinese state-led policy banks. In particular, China Exim provided €770

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[809] *Exim Bank Liaoning Branch Actively Promotes Supply-side Reform Deploys the Role of Policy-type Finance Functions to Support Liaoning Equipment Manufacturing Industry Transformation and Upgrading* [Chinese], THE EXPORT IMPORT BANK OF CHINA, http://english.eximbank.gov.cn/tm/nineteen/list_1198_30375.html, (last visited Oct.20, 2017).

[810] EXPORT-IMPORT BANK OF CHINA, ANNUAL REPORT2016, 57. The two preferential programs are the Concessional Loan and Preferential Export Buyer's Credit programs.

[811] *First Half Year Liaoning Province Equipment Manufacturing Foreign Investment Grows Three Fold* [Chinese], Policy Office of the NDRC Old Industrial Base Revitalization Division (July 28, 2017), http://dbzxs.ndrc.gov.cn/zttp/dwkf/201707/t20170728_855981.html (last visited Oct. 28, 2017); *Exim Bank Liaoning Branch Actively Promotes Supply-side Reform Deploys the Role of Policy-type Finance Functions to Support Liaoning Equipment Manufacturing Industry Transformation and Upgrading* [Chinese], THE EXPORT IMPORT BANK OF CHINA, http://english.eximbank.gov.cn/tm/nineteen/list_1198_30375.html (last visited Oct. 20, 2017).

[812] EXPORT-IMPORT BANK OF CHINA, ANNUAL REPORT2016, 37. The two preferential programs are the Concessional Loan and Preferential Export Buyer's Credit programs. These loans generally have a subsidized interest rate of 2-3 percent and a term of 15-20 years. *See* THE EXPORT IMPORT BANK OF CHINA, TWO PREFERENTIAL" LOAN BUSINESS INTRODUCTION [Chinese], slide 5 (2013).

[813] MIDEA GROUP CO., LTD 2016 ANNUAL REPORT 77 (Mar. 31, 2017), *available at* www.szse.cn.

[814] *About Kuka*, KUKA, https://www.kuka.com/en-us/about-kuka/. The company's U.S. locations comprise: KUKA Assembly and Test Corporation (Saginaw, MI); KUKA College USA - Shelby Township (Shelby Township, MI); KUKA ROBOTICS CORPORATION (Shelby Township, MI); KUKA Systems North America LLC (Sterling Heights, MI); KUKA Toledo Production Operations LLC (Toledo, OH); Reis Robotics USA Inc. d/b/a KUKA Industries (Carpentersville, IL); Swisslog Healthcare – Chicago Office (Schaumburg, IL); Swisslog Healthcare – Dallas Office (Farmers Branch, TX); Swisslog Healthcare – North America Headquarters (Denver, CO); Swisslog Healthcare – North Carolina (Kannapolis, NC); Swisslog Healthcare – Philadelphia Office (Bensalem, PA); Swisslog Healthcare – Seattle Office (Kirkland, WA); Swisslog Logistics – Americas Regional Headquarters (Newport News, VA); Swisslog Logistics – Midwest Office (Mason, OH); Swisslog Logistics – West Coast Office (Salida, CA).

[815] MIDEA GROUP CO., LTD 2016 ANNUAL REPORT 44 (Mar. 31, 2017), *available at* www.szse.cn.

[816] MIDEA GROUP CO., LTD 2016 ANNUAL REPORT 44 (Mar. 31, 2017), *available at* www.szse.cn.

[817] Midea Group is 34.75 percent owned by Midea Holding Co., Ltd., the parent, which is 94.55 percent owned by He Xiangjian (individual), who also owns 1.2 percent of Midea Group directly. Other shareholders hold less than 3 percent of shares each. MIDEA GROUP CO., LTD 2016 ANNUAL REPORT 83, 86 (Mar. 31, 2017), *available at* www.szse.cn.

million ($870 million) in loans,[818] and in a press release, linked this loan to the "One Belt One Road" and to promoting "international industrial capacity and equipment manufacturing cooperation" strategies, both of which are part of the "Going Out" strategy. China Exim states that the acquisition will "assist in optimizing the domestic robotics industry layout, promote the process of multi-industry production automation, and enhance China's intelligent manufacturing technology level."[819]

f) Renewable Energy

Government Policies

In the early 2000s, Chinese companies attempted significant oil and shale investments in the United States to improve China's energy security[820] and gain access to advanced technology.[821] After the major oil SOE China National Offshore Oil Corp. (CNOOC), one of China's major state-owned oil companies, failed in its bid to acquire Unicol in 2005,[822] it signed a series of shale gas "drill and carry"[823] agreements with foreign companies in 2010.[824] CNOOC's attempts to invest in such drill and carry deals in the United States fell off after CNOOC acquired Canada's Nexen in 2013 for $15 billion.[825] Nexen is a company with advanced shale gas technology,[826] of the kind targeted by Chinese development plans.[827]

Beginning in 2014, Chinese outbound investments in the U.S. energy sector declined significantly, especially in oil and gas. This decline appears to reflect a significant drop in

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[818] *Export-Import Bank of China Guangdong Branch Participates in Signing Ceremony for Bank Conglomerate for Financing Acquisition of Midea's KUKA* [Chinese], XINHUA NEWS, Aug. 21, 2017, *available at* http://www.gd.xinhuanet.com/newscenter/2017-08/21/c_1121516160.htm.

[819] *Export-Import Bank of China Guangdong Branch Participates in Signing Ceremony for Bank Conglomerate for Financing Acquisition of Midea's KUKA* [Chinese], XINHUA NEWS, Aug. 21, 2017, *available at* http://www.gd.xinhuanet.com/newscenter/2017-08/21/c_1121516160.htm.

[820] For instance, in the *12th Five-year Energy Development Plan*, Part 2, Chapter 2, one of the "basic principles" is to "improve energy security and the level of [energy] guarantee," *see State Council Notice on Issuing the 12th Five-year Energy Development Plan* (State Council, Guo Fa [2013] No. 2, issued Jan. 1, 2013).

[821] The *Notice on Issuing the Shale Gas Development Plan (2011-2015)* (NDRC, MoF, MLR, NEA, Fa Gai Neng Yuan [2012] No. 612, issued Mar. 23, 2012), at § 2(2)1(1), specifically calls for employing the IDAR methodology to gain and re-innovate advanced technology.

[822] David Barboza, Andrew Ross Sorkin, *Chinese Company Drops Bid to Buy U.S. Oil Concern*, THE NEW YORK TIMES, Aug. 3, 2005, *available at* http://www.nytimes.com/2005/08/03/business/worldbusiness/chinese-company-drops-bid-to-buy-us-oil-concern.html.

[823] Drill and carry agreements are transactions in which one company invests in another company by covering the costs of ongoing or future development/drilling. This lowers the capital expenditure of the target company, and gives the investing company a share of the resulting asset once it is in operation.

[824] CNOOC entered into two drill and carry agreements with the Chesapeake Energy Corporation in 2010. *See* Chesapeake Energy Corporation, 2010 Form 10-K 3, 113 (Mar. 1, 2011), on file with the SEC; *see also* Jenny Mandel, *Will U.S. Shale Technology Make the Leap Across the Pacific?*, E&E NEWS, July 17, 2012, https://www.eenews.net/stories/1059967354.

[825] Press release, Nexen Company, Nexen Announces Completion of Acquisition by CNOOC Limited (Feb. 25, 2013); Euan Rocha, CNOOC Closes $15.1 Billion Acquisition of Canada's Nexen, REUTERS, Feb. 25, 2013.

[826] *Operations - Shale Gas / Oil*, NEXEN COMPANY, *available at* http://www.nexencnoocltd.com/en/Operations/ShaleGasOil.aspx (last visited Dec. 27, 2017).

[827] *See, e.g.*, *State Council Notice on Issuing the 12th Five-year Energy Development Plan (2011-2015)* (State Council, Guo Fa [2013] No. 2, Jan. 1, 2013).

commodity prices;[828] restrictions on investment related to an internal corruption crackdown carried out by the CCP and heavily focused on the energy industry;[829] and growing attention to pollution and greenhouse gases, as reflected in the 2014 revision of the *Environmental Protection Law of the People's Republic of China*.[830]

Nonetheless, in recent years, Chinese investment appears to have grown in the renewable energy sector (see Section IV.C.1, above). For instance, as reported by AEI, China's investments in the U.S. energy sector in 2016 and 2017 were in alternative energy. [831]

The Chinese government has issued several policies to support the development of renewable energy technologies. Both the *12th Five-year Renewable Energy Development Plan* [832] and *13th Five-year Renewable Energy Development Plan* [833] touch on the need to develop renewable energy for the sake of "ensuring energy security, protecting the ecological environment, and responding to climate change."[834] Wind, solar, and hydroelectric power all play an important role in the development of renewable energy technologies.

Renewable energy equipment was listed as a "Key Sector" for development in the *Made in China 2025 Notice*.[835] The more detailed *Made in China 2025 Roadmap* calls for 90 percent of Chinese electricity needs to be met by Chinese electricity producers by 2020, and for 30 percent of energy production to be exported by 2020.[836] Likewise, the *Made in China 2025 Roadmap* seeks to have renewable energy equipment containing Chinese IP exceed 80 percent of China's domestic market by 2025.[837]

As discussed below, these policies have directed and influenced Chinese outbound investment in the renewable energy sector.

Chinese Investments in the U.S. Renewable Energy Sector

Hanergy Holding Group Ltd.

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[828] Henry Sanderson, Aniji Raval, David Sheppard, *Explainer: Why Commodities have Crashed*, FINANCIAL TIMES, Aug. 24, 2015.
[829] *Perspectives on Energy Sector Corruption and Anti-Corruption* [Chinese], CENTRAL COMMISSION FOR DISCIPLINE INSPECTION AND MINISTRY OF SUPERVISION OF THE PEOPLE'S REPUBLIC OF CHINA (Jul. 30, 2014), http://www.ccdi.gov.cn/lt/llsy/czfb/201407/t20140730_45795.html.
[830] *Environmental Protection Law of the People's Republic of China* (adopted Dec. 26, 1989, amended Apr. 24, 2014).
[831] *China Global Investment Tracker* (Jan. 2018), AEI, *available at* http://www.aei.org/china-global-investment-tracker, (last visited Oct. 25, 2017). AEI data includes announced deals, as well as completed transactions; it is possible that some of these transactions have not closed as of the date of this report's publication.
[832] *National Development and Reform Commission Notice on Issuing the 12th Five-year Renewable Energy Development Plan* (NDRC, Fa Gai Neng Yuan [2012] No. 1207, issued July 31, 2012).
[833] *National Development and Reform Commission Notice on Issuing the 13th Five-year Renewable Energy Development Plan* (NDRC, Fa Gai Neng Yuan [2016] No. 2619, issued Dec. 2016).
[834] *National Development and Reform Commission Notice on Issuing the 13th Five-year Renewable Energy Development Plan*, Preamble and § 1(1).
[835] *Made in China 2025 Notice* § 3(6)(7).
[836] *Made in China 2025 Roadmap* § 7(1)2.
[837] *Made in China 2025 Roadmap* § 7(1)2.

Since 2012, Hanergy Holding Group Ltd. (Hanergy) has acquired several U.S. and European companies specializing in thin-film solar technology. Hanergy was founded in 1994, and aims to be the largest thin-film solar technology producer in the world.[838] The advanced technology gained from these acquisitions contributed to Hanergy winning the "Made in China Top Ten Outstanding Quality Product Contribution Award" from the Made in China 2025 Summit Forum on November 25, 2017.[839] In Hanergy's press release on winning the award, Hanergy attributed its success to foreign acquisitions made between 2012 and 2014, and the company's desire to meet goals set out in the *13th Five-year Energy Development Plan* and realize Made in China 2025 goals through its solar film production.

In 2011, CDB extended a CNY 30 billion ($4.7 billion) line of credit to Hanergy, which provided "various types of financing services, including investment, loans, debt, leasing, and certification" to support Hanergy's development.[840] According to the official Hanergy press release on the CDB line of credit, the funding was intended to "*assist Hanergy in introducing, digesting, and absorbing the world's advanced solar energy power technology*."[841]

The CDB line of credit appears to have fueled a buying spree. In 2013, Hanergy acquired Solibro, a world-leading German CIGS[842] thin-film module manufacturer[843] for CNY 200 million ($33 million). Hanergy had already acquired two U.S. companies by 2014 – Global Solar Energy[844] and MiaSolé.[845] These acquisitions gave Hanergy access to advanced CIGS technology, which enabled the company to achieve potential solar cell efficiency of nearly 20 percent.[846] And in 2015, Hanergy acquired U.S.-based Alta Devices,[847] an award-winning thin-film solar technology producer. Alta Devices had been named to MIT's list of "Most Disruptive Companies" and broke multiple world records for solar cell efficiency.[848]

Hanergy's efforts to acquire thin-film solar cell technology align with government policy objectives. This fact is evident in the *Solar Energy Power Technology Development "12th Five-*

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[838] *Thin-film Solar Power Generation*, HANERGY, http://www.hanergy.com/en/industry/industry_310.html (last visited Nov. 15, 2017).
[839] Press Release, Hanergy, Hanergy Wins "Made in China Top Ten Outstanding Quality Product Contribution Award" [Chinese] (Dec. 8, 2017), *available at* http://www.hanergy.com/content/details_37_24993.html.
[840] Zhao Xiaohui, Tao Junjie, *China Development Bank Will Provide CNY 30 billion to Hanergy Group to Support Development of Clean Energy* [Chinese], XINHUA NEWS, Nov. 11, 2013, http://www.ccchina.gov.cn/Detail.aspx?newsId=15735&TId=57 (last visited Nov. 6, 2017).
[841] *Hanergy Holding Group Obtains CNY 30 billion in China Development Bank Financial Support – Accelerating Clean Energy Development – Expanding Overseas Business* [Chinese], HANERGY http://www.hanergy.com/mobile/content/details_37_924.html (last visited Nov. 6, 2017) (emphasis added).
[842] Copper indium gallium selenide (CIGS) solar cells are one of three types of mainstream thin-film solar cells, a technology some analysts predict will be the market leader in thin-film technology due to "advantages on [sic] cost, flexibility, weight, and manufacturability." *See Thin-Film Photovoltaic (PV) Cells Market Analysis to 2020*, SUN&WIND ENERGY, http://www.sunwindenergy.com/news/thin-film-photovoltaic-pv-cells-market-analysis-2020 (last visited Nov. 6, 2017).
[843] *About Us*, SOLIBRO, http://solibro-solar.com/en/company/about-us/ (last visited Nov.16, 2017).
[844] HANERGY THIN FILM POWER GROUP LTD, 2013 ANNUAL REPORT 249 (Mar. 24, 2014).
[845] HANERGY THIN FILM POWER GROUP LTD, 2013 ANNUAL REPORT 6 (Mar. 24, 2014).
[846] HANERGY THIN FILM POWER GROUP LTD, 2013 ANNUAL REPORT 6 (Mar. 24, 2014).
[847] HANERGY THIN FILM POWER GROUP LTD, 2015 ANNUAL REPORT 49 (Mar. 31, 2016).
[848] *Company Highlights*, ALTA DEVICES, https://www.altadevices.com/about-overview/ (last visited Nov. 6, 2017); HANERGY THIN FILM POWER GROUP LTD, 2015 ANNUAL REPORT 5 (Mar. 31, 2016).

year" Special Plan,[849] which affirmed the state objective of "break through scaling key equipment design and manufacturing bottlenecks in CIGS thin-film solar cell production lines."[850] Likewise, Hanergy's president and chairman, Li Hejun, attributed his company's success in acquiring these companies and becoming a world leader in thin-film solar panels to "the strong support of the local Party committee and government."[851] Li Hejun serves in the Chinese People's Political Consultative Conference (CPPCC) and is the vice chairman of the National Federation of Industry and Commerce.[852]

Chinese authorities have pointed to Hanergy as an example of "unceasingly enlarging the area of investment in developed countries in Europe and America."[853] In an article on Hanergy's acquisition of MiaSolé, the Chinese consulate in San Francisco reportedly stated that the Chinese government has begun to restrict large loans to companies in the solar industry, now that the investments "have caused this industry to expand capacity by 17 times."[854]

Goldwind/Renewable Energy Systems Americas

In 2016, Goldwind Americas (Goldwind) acquired a 160 MW wind project from Renewable Energy Systems Americas in a "balance of plant"[855] deal worth $250 million.[856] Through the transaction, Goldwind obtained the ability to install 64 of its own Permanent-Magnet Direct Drive (PMDD) 2.5 MW wind turbines in the United States,[857] the same technology Goldwind acquired through previous overseas transactions. A May 2016 report states that once complete, the wind project will become Goldwind's largest U.S. wind project to date.[858]

Goldwind is a subsidiary of Xinjiang Goldwind Technology Holding Co., Ltd., a company whose three largest shareholders are (1) undisclosed shareholders from the Hong Kong Stock

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[849] *Notice on Issuing Solar Energy Power Technology Development "12th Five-year" Special Plan* (MOST, Guo Ke Fa Ji [2012] No. 198, issued Mar. 27, 2012).
[850] *Notice on Issuing Solar Energy Power Technology Development "12th Five-year" Special Plan* § 4(2)2(3).
[851] Zhang Zhirong, *Li Xinyuan Agricultural Rate of Investment Promotion Small Group Team Arrives at Hangery Holding Group to Inspect and Present* [Chinese], GUIGANG NEWS NET Aug. 31, 2017, *available at* http://www.gxgg.gov.cn/news/2017-08/140463.htm (last visited Nov. 6, 2017).
[852] *Li Hejun Introduction* [Chinese], HANERGY http://www.hanergy.com/about/mrLi.html (last visited Nov. 6, 2017).
[853] MOFCOM, *Report on Development of China's Outward Investment and Economic Cooperation 2016* 132 (Dec. 2016).
[854] *Hanergy Completes U.S. Thin Film Solar Energy Firm Acquisition* [Chinese], MOFCOM (Jan. 17, 2013), http://dwtztj.hzs.mofcom.gov.cn/article/i/jyjl/l/201301/20130100005202.shtml (last visited Nov. 6, 2017).
[855] This "balance of plant" deal is an agreement between RES, which supplies and installs the infrastructure for the project as a contractor, and Goldwind, which installs the wind turbines – here, Goldwind's China-produced 2.5 MW PMDDs. *See* Press Release, Goldwind, Goldwind Americas Signs 160 MW Texas Deal with RES (May 17, 2016); Press Release, Goldwind, Rattlesnake Stirs Texas, *available at* http://www.goldwindamericas.com/rattlesnake-stirs-texas; XINJIANG GOLDWIND SCIENCE & TECHNOLOGY CO., LTD., OVERSEAS SUPERVISION REPORT 7 [Chinese] (Aug. 25, 2017).
[856] XINJIANG GOLDWIND SCIENCE & TECHNOLOGY CO., LTD., OVERSEAS SUPERVISION REPORT 6-7 [Chinese] (Aug. 25, 2017), *available at* www.goldwind.com.cn. Goldwind Americas' parent company, Goldwind Holdings, provided bridge financing and "construction and tax equity financing and a long-term ERCOT fixed price hedge for power production." *See* Press Release, Xinjiang Goldwind Technology Holding Company, Goldwind Americas Signs 160 MW Texas Deal with RES (May 17, 2016).
[857] XINJIANG GOLDWIND SCIENCE & TECH CO., LTD, 2016 ANNUAL REPORT 18 [Chinese] (Mar. 2017).
[858] *Texas Wind-Power Project Acquired*, CHINA DAILY (USA), May 23, 2016.

Exchange (18.23 percent), (2) the SOE Xinjiang Wind Energy Ltd., Co. (13.74 percent), and (3) the central SOE China Three Gorges New Energy Ltd., Co. (10.52 percent).[859]

The PMDD technology that Goldwind now produces and is exporting to the United States is technology that Goldwind gained by acquiring a 70 percent share of German company Vensys in March 2008.[860] Goldwind's acquisition of Vensys was financed through a €4.9 million ($7 million) equity investment and a €36.34 million ($54 million) "financing guarantee" loan[861] with the China Construction Bank as the guarantor.[862] At the time, MOFCOM pointed to the acquisition of Vensys as an example of "German Enterprises Actively Undertaking Technology Transfer to China,"[863] and as an example of the effectiveness of the "Financing Guarantee" policy bank loan program.[864]

The Goldwind 2016 Annual Report points to the *13th Five-year Plan*'s push to have "three to five equipment manufacturing enterprises fully attain international advanced levels, and clearly increase market share" as one of Goldwind's "policy considerations" for future development planning.[865]

g) *Automotive*

Government Policies

Since 2004, the Chinese government has issued a series of plans to encourage technological development in the automotive sector:

- The NDRC 2004 *Policy on Development of the Automotive Industry*[866] established the basis for China's automotive industrial policy after WTO accession. It includes specific provisions on mandating approvals of foreign investments,[867] in addition to long-term

[859] XINJIANG GOLDWIND SCIENCE & TECH CO., LTD, 2016 ANNUAL REPORT 53 [Chinese] (Mar. 2017).
[860] Press Release, Xinjiang Goldwind Technology Holding Company, Announcement on Acquiring German Vensys Energy Holding Company §4(1) [Chinese] (Jan. 25, 2008), *available at* www.szse.cn.
[861] The "Financing Guarantee" loan is a special loan program from Chinese policy banks in which a Chinese enterprise can guarantee a loan for a foreign enterprise, and by using a Chinese loan, gain access to lower interest loan financing to "lower the cost of financing". *See*, *Credit Business* [Chinese], CHINA CONSTRUCTION BANK, *available at* http://www.ccb.com/tokyo/cn/service/244780.html (last visited Nov. 1, 2017).
[862] Press Release, Xinjiang Goldwind Technology Holding Company, Announcement on Acquiring German Vensys Energy Holding Company §5(2)2 (Jan. 25, 2008). This loan scheme allows a Chinese bank, in this case CCB, to back Goldwind, which otherwise may not have qualified for a loan large enough for the transaction. *Credit Business* [Chinese], CHINA CONSTRUCTION BANK, *available at* http://www.ccb.com/tokyo/cn/service/244780.html (last visited Nov. 1, 2017).
[863] *Overview of German Wind Industry, Current Situation and Prospects of Cooperation with China* § 2(1) [Chinese], MOFCOM'S GERMAN COUNSELLOR'S OFFICE (Dec. 14, 2009), http://munich.mofcom.gov.cn/article/ztdy/201005/20100506926532.shtml (last visited Nov. 1, 2017).
[864] *Overview of German Wind Industry*, *Current Situation and Prospects of Cooperation with China* § 2(4) [Chinese], MOFCOM'S GERMAN COUNSELLOR'S OFFICE (Dec. 14, 2009), *available at* http://munich.mofcom.gov.cn/article/ztdy/201005/20100506926532.shtml (last visited Nov. 1, 2017).
[865] XINJIANG GOLDWIND SCIENCE & TECH CO., LTD, 2016 ANNUAL REPORT 12 (Mar. 2017).
[866] *Policy on Development of the Automotive Industry* (NDRC, Order No. 8, issued May 21, 2004).
[867] *Policy on Development of the Automotive Industry*, arts. 43, 44.

objectives to create global well-known brands[868] and indigenously develop electric, hybrid, and alternative fuel technologies.[869]

- The State Council's 2009 *Plan on Adjusting and Revitalizing the Auto Industry* pledges CNY 10 billion ($1.4 billion)[870] in government financing over three years to promote technological progress, part of China's CNY 4 trillion ($586 billion)[871] stimulus plan. The financing would go toward targeted support for safer, fuel-efficient, environmentally friendly vehicles; filling domestic supply chain gaps; and creating collective platforms for technology R&D and testing in the auto parts sector.[872]

- The 2009 *Opinions on Promoting the Sustainable and Healthy Development of China's Exports of Automotive Products*[873] targets a 10 percent share of global auto parts exports for Chinese automakers by 2020.[874] The *Opinions* also call for improvements in the composition of exports to include a higher share of indigenous brands and passenger sedans, as well as new energy vehicles.[875]

- The 2013 MIIT *Guiding Opinions on Accelerating and Promoting Industry Mergers and Restructuring* set a target to establish three to five globally competitive, large-scale domestic automakers through mergers and acquisitions among existing players and a consolidation of their respective global assets.[876]

- China identified NEVs as one of the priority research areas in the 2006 *(MLP)*,[877] and NEVs were selected as one of China's seven SEIs, as set forth in the 2012 *12th Five-year Strategic Emerging Industries Development Plan*.[878] Pursuant to these plans, the *Energy-Saving and New-Energy Automotive Industry Development Plan (2012-2020)*,[879] which

[868] *Policy on Development of the Automotive Industry*, art. 3.
[869] *Policy on Development of the Automotive Industry*, art. 8.
[870] *Plan on Adjusting and Revitalizing the Auto Industry* § 4(9) (State Council, Issued Mar. 20, 2009).
[871] In 2008, the dollar value of this stimulus plan was reported as $586 billion. *See*, *China Seeks Stimulation*, THE ECONOMIST, Nov. 10, 2008. Due to subsequent appreciation of the CNY against the USD, the plan would now be worth approximately $600 billion.
[872] *Plan on Adjusting and Revitalizing the Auto Industry* § 4(9) (State Council, Issued Mar. 20, 2009).
[873] *Opinions on Promoting the Sustainable and Healthy Development of China's Exports of Automotive Products* (MOFCOM, NDRC, MIIT, MOF, General Administration of Customs, and General Administration of Quality Supervision, Inspection and Quarantine, Shang Chan Fa [2009] No. 523, issued Oct. 23, 2009).
[874] *Opinions on Promoting the Sustainable and Healthy Development of China's Exports of Automotive Products* § 2(2) (MOFCOM, NDRC, MIIT, MOF, General Administration of Customs, and General Administration of Quality Supervision, Inspection and Quarantine, Shang Chan Fa [2009] No. 523, issued Oct. 23, 2009).
[875] *Opinions on Promoting the Sustainable and Healthy Development of China's Exports of Automotive Products* § 2(2) (MOFCOM, NDRC, MIIT, MOF, General Administration of Customs, and General Administration of Quality Supervision, Inspection and Quarantine, Shang Chan Fa [2009] No. 523, issued Oct. 23, 2009).
[876] *Guiding Opinions on Accelerating and Promoting Industry Mergers and Restructuring* § 2(1) (MIIT, NDRC, MOF, and nine other ministries, Gong Xin Bu Lian Chan Ye [2013] No. 16, published Jan. 22, 2013).
[877] *Notice on Issuing the National Medium- and Long-Term Science and Technology Development Plan Outline (2006-2020)* § 3(36) (State Council, Guo Fa [2005] No. 44, issued Dec. 26, 2005).
[878] *Notice on Issuing the 12th Five-year National Strategic Emerging Industries Development Plan* § 3(7).
[879] *Energy-Saving and New-Energy Automotive Industry Development Plan (2012-2020)* § 3(2) (State Council, Guo Fa [2012] No. 22, issued June 28, 2012).

was issued in 2012, sets ambitious targets for increasing the production and consumption of NEVs in China (see Section II.B.2(a) above for further discussion).

The Chinese government has made clear that outbound investment is an important part of this strategy. For instance, the 2009 *Plan on Adjusting and Revitalizing the Automotive Industry* states:

> Formulate policies corresponding to aspects including technological development, government procurement, and financing channels; guide automotive manufacturing enterprises in making the development of indigenous brands a priority for enterprise strategy; support automotive manufacturing enterprises to use multiple methods, including indigenous development, coordinate development, and domestic and *foreign acquisitions*, to develop indigenous brands.[880]

State-owned entities have played an important role in China's automotive sector. Two of China's three largest automakers – First Automotive Works (FAW) and Dongfeng Motor – are central SOEs administered by SASAC. Several other automakers, including SAIC, are owned by provincial governments.[881] The market leaders in China in terms of sales are SOEs, and these firms are the principal beneficiaries of government-mandated joint ventures with foreign carmakers.[882]

State-owned policy banks have provided financial support to Chinese automakers investing overseas. For example, the provincial state-owned automaker Chery Motors signed a strategic cooperation agreement with China Exim that involved a CNY 10 billion ($1.4 billion) loan to finance overseas expansion.[883] When China Exim in 2012 highlighted its support for China's outbound investment, it listed Chery alongside major steel, machinery and petrochemical companies.[884]

Chinese Investments in the U.S. Automotive Sector

AVIC-Pacific Century Motors/Nexteer Automotive

AVIC, the central SOE tasked with developing China's aviation industry, has been an active investor in the U.S. automotive sector.

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[880] *Plan on Adjusting and Revitalizing the Automotive Industry* § 3(6).
[881] *State Asset Report Independent Interpretation of 48 Central and 18 Local SOEs Enter the 2017 Fortune World 500 List* [Chinese], http://www.sasac.gov.cn/n2588025/n2588164/n4437287/c7428253/content.html. The "500 List" includes BAIC Group and GAC Group as local state owned auto manufacturers.
[882] A June 2015 article lists the leading brands in China as: (1) Volkswagen (VW -FAW – SAIC joint venture); (2) Chang'an; (3) Hyundai (Hyundai – BAIC joint venture); (4) Buick (GM – SAIC joint venture); (5) Ford (Ford – Chang'an joint venture). *Vehicle Sales Rankings in China: Strong Performance for Domestic Brands, Changan Ranked Second Behind Market Leader Volkswagen*, AUTOMOTIVE WORLD, June 1, 2015.
[883] Patti Waldmeir, *Chery Gets $1.5bn Loans from China Exim Bank*, FINANCIAL TIMES, Dec. 8, 2008.
[884] *Economic Daily: Export-Import Bank of China Strategy Transformed into Innovation Development* [Chinese], THE EXPORT IMPORT BANK OF CHINA (Oct. 30, 2012), http://www.eximbank.gov.cn/tm/medialist/index_26_16570.html.

In 2010, Pacific Century Motors purchased Nexteer Automotive, a maker of steering systems, from General Motors,[885] in a deal with an estimated value of $450 million.[886] At the time, Pacific Century Motors was owned by an investment company under the Beijing municipal government. In 2011, majority ownership of Pacific Century Motors was transferred to the central SOE AVIC, which acquired a 51 percent stake in the firm.[887] As a result, AVIC is now the majority owner of Nexteer Automotive.

AVIC/Hilite International

In May 2014, ACIF Electromechanical Systems Co., Ltd. (AVICEM), a subsidiary of AVIC, acquired Hilite International, a German-headquartered company with operations in the United States and China, in a deal valued at €473 million ($629 million).[888] Hilite International describes itself as "a global supplier of leading automotive system solutions" with "engine, transmission and emission control products [that] are used to improve fuel efficiency and reduce emissions for passenger cars and commercial vehicles."[889] The company's U.S. operations comprise three units: (1) a sales and R&D center in Orion, Michigan; (2) a production site for camphasing valves, on/off & PWM solenoids, cylinder deactivation valves and integrated solenoid module assemblies in Whitehall, Michigan; and a (3) production site for machining of rotors and stators for camphasers, assembly and testing of camphasers, and coil armature assemblies for 4WD and AWD applications in Dallas, Texas.[890] Hilite's China operations comprise a Shanghai office that coordinates the firm's sales, purchasing, and engineering activities for Asia, and a plant in Changshu, Jiangsu province, which makes DCT components and VVT phasers and valves.[891]

AVIC/Henniges Automotive

In June 2015, AVIC purchased 51 percent of the shares of Henniges Automotive, a producer of sealing and anti-vibration solutions for high-end automobiles.[892] The remaining 49 percent of Henniges was acquired by BHR, an investment firm backed by Bank of China, one of China's four large state-owned commercial banks, and the Chinese funds Bohai Industrial Investment Funds and Shanghai Ample Harvest (a subsidiary of Shanghai Harvest Fund).[893] The entire acquisition was valued at around $600 million.[894]

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[885] Press Release, General Motors, GM Finalizes Sale of Nexteer to Pacific Century Motors (Nov. 29, 2010).
[886] *G.M. Sells Parts Maker to a Chinese Company*, NEW YORK TIMES, Nov. 29, 2010.
[887] *State-owned AVIC Buys US-based Nexteer*, CHINA DAILY, Apr. 11, 2011.
[888] Press Release, Hilite International, Hilite International Accelerates Global Growth Prospects with New Owner AVICEM (May 29, 2014).
[889] Press Release, Hilite International, Hilite International Opens New Plant in China (Dec. 6, 2011).
[890] *Locations – USA*, HILITE INTERNATIONAL, http://www.hilite.com/corporate/locations/usa.html (last visited Nov. 20, 2017).
[891] *Locations – USA*, HILITE INTERNATIONAL, http://www.hilite.com/corporate/locations/usa.html (last visited Nov. 20, 2017).
[892] *AVIC Agrees to Acquire the U.S. Automotive Parts Manufacturer Henniges* [Chinese], CNSTOCK, June 30, 2015, http://news.cnstock.com/news,bwkx-201506-3477281.htm.
[893] *BHR Acquires Henniges Automotive*, BHR Partners (Sept. 8, 2015); *BHR and AVIC Auto Acquire Henniges Automotive*, PR NEWSWIRE, Sept. 15, 2015.
[894] *BHR and AVIC Auto Acquire Henniges Automotive*, PR NEWSWIRE, Sept. 15, 2015.

Wanxiang Acquisitions in the NEV Sector

In 2013, A123 Systems, which produces lithium batteries for electric vehicles, was purchased by the U.S. subsidiary of Wanxiang Group, Wanxiang America Corp., for $257 million.[895] In 2014, Fisker Automotive, a plug-in vehicle producer, was sold in bankruptcy to Wanxiang America, a subsidiary of Wanxiang Group, for $149 million.[896]

Lithium batteries are a focal point of NEV development in China, and the Chinese government has restricted market access for foreign battery makers in China's fast growing NEV industry.[897] Lithium-ion batteries are used in the automotive sector for start-stop technology, and for use in electric and hybrid vehicles. The automotive sector presents a significant growth opportunity for lithium-ion batteries.[898]

Wanxiang Group has been classified as a nationally important corporation by the State Council, and it receives government support in exchange for fulfilling national policy objectives.[899] Wanxiang received at least $6.5 million in Chinese government subsidies in 2015,[900] and received approximately $8.8 million in government subsidies in 2016.[901] Based on the company's 2015 annual report, Wanxiang's chairman has been a member of the NPC,[902] and one board member has received a special salary from the State Council.[903]

3. Leveraging "International Innovation Resources" Through Engagement with Silicon Valley

The Chinese leadership is pursuing an "innovation-driven" strategy for civilian and military development, seeking to become a science and technology superpower [904]and emerge as a leading innovator by 2030.[905] In pursuit of this agenda, Chinese investment activities have been particularly prevalent in U.S. technology centers such as Silicon Valley and Boston.

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[895] *Chinese Firm Wins A123 Despite U.S. Tech Transfer Fears*, REUTERS, Jan. 29, 2013.
[896] J. Voelcker, *Fisker Assets Sold for $149 Million to Wanxiang, Chinese Parts Maker*, GREEN CAR REPORTS, Feb. 15, 2014; *China's Wanxiang Wins U.S. Bankruptcy Auction for Fisker Automotive*, REUTERS, Feb. 14, 2014.
[897] Chinese Battery Manufacturers Increasing Their Ternary Battery Production Volume, MEHR NEWS AGENCY, Aug. 29, 2016.
[898] *Lithium-ion Battery Market to Reach $41 Bn*, INDUSTRIAL MINERALS, Sept. 2, 2013; *Insight: Electric Car Revolution Brightens Outlook for a Medley of Metals*, THE PENINSULA Oct. 5, 2016. A marginal increase in electric vehicle units translates into a large increase in battery demand; for example, each Tesla electric vehicle contains battery capacity of approximately 85,000 watt-hours (Wh), compared to just 5 Wh for an average cell phone.
[899] *Joyson Electronics Receives RMB 14.95 Million for a Great and Strong New Energy Vehicle Industry* [Chinese], NINGBO JOYSON ELECTRONICS HOLDING LTD CORP. (Apr. 16, 2014), *available at* http://www.joyson.cn/index.php?a=shows&catid=84&id=169.
[900] WANXIANG GROUP, 2015 ANNUAL REPORT 131 [Chinese] (2015).
[901] WANXIANG GROUP, 2016 ANNUAL REPORT 132 [Chinese] (2015).
[902] WANXIANG GROUP, 2015 ANNUAL REPORT 53 [Chinese] (2015).
[903] WANXIANG GROUP, 2015 ANNUAL REPORT 53 [Chinese] (2015).
[904] English translation of the Chinese term *keji chuangxin qiangguo*.
[905] *Xi Jinping: Comprehensively Advance an Innovation Driven Development Strategy, Advance New Leaps in Realizing National Defense and Military Construction* [Chinese], XINHUA NEWS, Mar. 13, 2016, http://news.xinhuanet.com/politics/2016lh/2016-03/13/c_1118316426.htm. *See also* the official strategy released on innovation-driven development: *CCP State Council Releases the "National Innovation-Driven Development*

According to data from CB Insights, China-based investors have engaged in technology investments (*i.e.*, corporate, VC, angel, private equity, etc.) amounting to $19 billion in the United States, across 641 different deals, since 2012, with particular focus on AI, robotics, and augmented or virtual reality.[906] China's sovereign wealth fund, CIC, is reportedly taking steps to begin direct investment in U.S. technology start-ups.[907] In recent years, Chinese investment activities have accounted for approximately 10 percent of all U.S. venture deals per year, and have started to receive greater attention.[908]

Chinese investments in U.S. technology start-ups are part of a multifaceted technology and knowledge transfer strategy. This strategy is reflected in several national plans, including the Made in China 2025 policy, the *"Internet Plus" Artificial Intelligence Three-Year Action Implementation Plan*, the *Robot Industry Development Plan (2016-2020)*, [909] and the *13th Five-year National Science and Technology Innovation Plan*. The *Next-Generation Artificial Intelligence Development Plan*, released in July 2017, calls for a "Going Out" strategy that includes overseas mergers and acquisitions, equity investments, VC, and the establishment of research and development centers abroad.[910]

Reflecting these objectives, Chinese entities have established research centers and "talent bases" in Silicon Valley, directly funded and partnered (*e.g.*, joint laboratories) with academic research institutions, and actively recruit top talent through government programs.

For example, iFlytek, a prominent Chinese AI start-up focused on intelligent voice recognition and speech-to-text products established an office in Silicon Valley in 2016.[911] According to iFlytek's website, it receives 863 program funding[912] for speech technology and is recognized as a key software enterprise under the National Planning and Layout of Key Software Companies.[913] iFlytek also serves as the leading unit on MIIT's "Working Group on Technical

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Strategy Guidelines [Chinese], XINHUA NEWS, May 19, 2016, http://news.xinhuanet.com/politics/2016-05/19/c_1118898033.htm.

[906] *From China with Love: AI, Robotics, AR/VR Are Hot Areas For Chinese Investment In US*, CB INSIGHTS, Aug. 1, 2017.

[907] Theodore Schleifer, *Chinese investors are making moves to increase their spending in Silicon Valley*, RECODE, Oct. 29, 2017. To date, China Investment Corporation investments in U.S. tech start-ups have been through investments in VC firms as a limited partner.

[908] Paul Mozur, Jane Perlez, *Chinese Tech Investment Flying Under the Radar, Pentagon Warns*, NEW YORK TIMES, Apr. 7, 2017.

[909] *Release of the Robot Industry Development Plan* [Chinese], NATIONAL DEVELOPMENT AND REFORM COMMISSION (Apr. 26, 2016), http://www.ndrc.gov.cn/zcfb/zcfbghwb/201604/t20160427_799898.html.

[910] *State Council Notice on the Issuance of the New Generation Artificial Intelligence Development Plan* (State Council, Guo Fa [2017] No. 35, issued July 8, 2017), http://www.gov.cn/zhengce/content/2017-07/20/content_5211996.htm.

[911] *iFlytek – Why is it One of the 'World's Most Intelligent Companies'?* [Chinese], ECONOMICS DAILY, Aug. 17, 2017, http://www.ce.cn/cysc/tech/gd2012/201708/17/t20170817_25062923.shtml.

[912] The 863 program is a National High-Tech R&D Program which provides funding to promote advances in technology. *See National High-tech R&D Program* (863) *Program*, MOST, *available at* http://www.most.gov.cn/eng/programmes1 (last visited Dec. 22, 2017).

[913] *Administrative Measures for Accreditation of National Planning and Layout Key Software Enterprises* (SAT, MOFCOM, and MIIT, Fa Gai Gao Ji [2005] No. 2669, issued Dec. 20, 2005), pursuant to the *Several Policies on Encouraging the Development of the Software and Integrated Circuit Industry* (State Council, Guo Fa [2000] No.

Standards for Interactive Chinese Language Technology."[914] In addition, iFlytek operates from the Anhui Hefei High-tech Industry Development Zone, one of at least 28 MIIT designated national-level MCF bases.[915] MCF bases seek to foster development of China's high-tech industry to support military modernization and economic development.[916]

A number of major Chinese technology companies have established offices and laboratories in Silicon Valley, and there are even a number of new incubators that seek to establish closer engagement with start-ups. These same companies, in turn, are cooperating with the Chinese government to establish technology centers within China, often in the form of local government initiatives that focus on emerging and dual-use technologies.

For instance, in 2014, the Hangzhou Hi-Tech Venture Capital Co. Ltd., a company owned by the municipal government of Hangzhou,[917] founded the Hangzhou Silicon Valley Incubator,[918] located in Redwood City, California.[919] As of late 2016, the incubator had supported 30 projects, investing a total of $3.4 million, and attracting 41 overseas projects to settle or plan to return to Hangzhou, which has the official goal of becoming "China's Silicon Valley."[920] Projects promoted in the incubator include autonomous driving and smart vehicles, robotics, and the conversion of exhaust gas into electrical energy.[921]

In this context, it is important to consider that the "Going Out" strategy is part of a dual "Going Out and Drawing In" approach. While China incentivizes domestic companies to invest abroad, it also encourages innovative enterprises from Silicon Valley and worldwide to establish operations in China under the "Drawing In"[922] strategy. For example, the concept of "Drawing

18, issued June 24, 2000). Becoming an accredited "key software enterprise" requires companies to submit corporate records, including contracts, exports, and financial data, to the China Software Industry Association for examination. Accredited "key software companies" receive preferential tax treatment, notably a corporate income tax rate of 10 percent. *See also Company Profile*, IFLYTEK, http://www.iflytek.com/about/index.html (last visited Nov. 8, 2017).

[914] *Company Profile*, IFLYTEK, http://www.iflytek.com/about/index.html (last visited Nov. 8, 2017).

[915] *Description of National New Industrial Demonstration Base* [Chinese], MIIT (Feb. 2012), http://sfjd.miit.gov.cn/BaseInfoAction!findListIndustry.action; Huai Chuai, *Let the World Hear 'Anhui's Voice'—Hefey High Tech Industry Development Zone Smart Language Industry's Concentrated Development Base Quest* [Chinese], ANHUI DAILY, May 4, 2016, http://www.iflytek.com/content/details_135_2092.html

[916] *Description of National New Industrial Demonstration Base* [Chinese], MIIT (Feb. 2012), http://sfjd.miit.gov.cn/BaseInfoAction!findListIndustry.action.

[917] Company profile available on Hangzhou municipal government website, *available at* http://www.hangzhou.gov.cn/art/2015/11/12/art_810110_1100.html (last visited Jan. 9, 2018).

[918] *Hangzhou Silicon Valley Incubator Going Out to Promote 41 Overseas High-tech Projects* [Chinese], HANGZHOU NEWS, Dec. 6, 2016, http://hznews.hangzhou.com.cn/jingji/content/2016-12/06/content_6410731.htm; *Hangzhou, Cross-Border Venture Capital Investment Gradually Improving* [Chinese], HUANQIU NET, Dec. 21, 2016, http://finance.huanqiu.com/roll/2016-12/9838718.html.

[919] *The Journey to Knowledge Acquisition: Hangzhou Silicon Valley Incubator "Accomplish Great Things with Little Effort* [Chinese], HANGZHOU NET, Sept. 26, 2017, http://hznews.hangzhou.com.cn/jingji/content/2017-09/26/content_6671062.htm.

[920] *Hangzhou Silicon Valley Incubator Going Out to Promote 41 Overseas High-tech Projects* [Chinese], HANGZHOU NEWS Dec. 6, 2016, http://hznews.hangzhou.com.cn/jingji/content/2016-12/06/content_6410731.htm.

[921] *Hangzhou Silicon Valley Incubator Going Out to Promote 41 Overseas High-tech Projects* [Chinese], HANGZHOU NEWS Dec. 6, 2016, http://hznews.hangzhou.com.cn/jingji/content/2016-12/06/content_6410731.htm.

[922] English translation of Chinese term *zou jin lai* or *yinjin*.

In" regularly appears in the context of MOST initiatives and high-tech parks administered by local governments.[923]

Below, this dual "Going Out and Drawing In" approach is discussed in the context of the activities of Zhongguancun Development Group (ZGC Group).

Zhongguancun and the Zhongguancun Development Group

ZGC Group is an SOE established in April 2010 by the Beijing municipal government in order to accelerate development of Zhongguancun,[924] a Beijing-based technology park vying with other localities to become China's next Silicon Valley.[925] ZGC Group is actively seeking opportunities to expand its overseas presence, particularly in the United States' Silicon Valley. The ZGC Group website states:

> [W]e are accelerating the expansion of overseas operations with a view toward "One Belt One Road" and the internationalization of Zhongguancun, in accordance with the concept of "drawing in, going out, and localization," we are establishing a "one office, one fund, one center" constellation of operations in Silicon Valley, and are constructing a platform that links Zhongguancun to Silicon Valley through reciprocal exchanges. And by emulating the Silicon Valley model, we are undertaking an expansion of our operations toward innovation resource cluster areas and national strategic node areas in North America, Europe, and elsewhere, advancing the global distribution of Zhongguancun enterprises and accelerating the internationalization of Zhongguancun.[926]

In pursuit of these objectives, ZGC Group established the ZGC Group Silicon Valley Incubator Center in December 2012. According to ZGC Group, this center is "ZGC Group's trial base for establishing a branch entity in the United States' Silicon Valley."[927] It is located inside the Zhongguancun Hanhai Science and Technology Park, established by another Chinese company, Beijing Hanhai Zhiye Investment Management Co., Ltd.,[928] a subsidiary of Beijing Hanhai Holdings Group.[929] The Zhongguancun Hanhai Science and Technology Park is designed to

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[923] *See*, *e.g.*, *Aligning to the Standards, Promote the Close Promotion of Science and Technology—Take Advantage of Strength, Build a Science Technology Innovation Center* [Chinese], SHENZHEN MUNICIPAL SCIENCE AND TECHNOLOGY INNOVATION COMMITTEE, (Nov. 18, 2016), *available at* http://www.szsti.gov.cn/news/2016/11/18/1.
[924] *About Us* [Chinese], ZHONGGUANCUN DEVELOPMENT GROUP, http://www.zgcgroup.com.cn/about/index.html (last visited Jan. 11, 2018).
[925] *Vying for "China Silicon Valley"* [Chinese], XINHUA NEWS, Apr. 20, 2017, http://news.xinhuanet.com/fortune/2017-04/20/c_129557023.htm.
[926] *Group Overview* [Chinese], ZHONGGUANCUN DEVELOPMENT GROUP, http://www.zgcgroup.com.cn/about/intro.html (last visited Jan. 11, 2018).
[927] *ZGC Group Silicon Valley Incubator Center Established and Open for Business* [Chinese], ZHONGGUANCUN DEVELOPMENT GROUP, Dec. 6, 2012, http://www.zgcgroup.com.cn/news/details_16_927.html.
[928] *Zhongguancun Hanhai Silicon Valley Science and Technology Park Reaches Out Feelers to Silicon Valley to Influence the World* [Chinese], PEOPLE'S DAILY, Nov. 14, 2012, http://usa.people.com.cn/n/2012/1114/c241376-19581508.html.
[929] Beijing Hanhai Holdings Group manages numerous science and technology parks outside China, and in introducing these overseas projects on its website, states: "In recent years, Beijing Hanhai Holdings Group, under the resolute guidance of leaders at all levels, including the national Ministry of Science and Technology, the

serve as an incubator for U.S and Chinese ventures and to facilitate Chinese investment in the United States, promoting the combination of "drawing in[930]" – *i.e.*, attracting investment and talent to China – and implementing the "Going Out" strategy.[931]

In October 2014, ZGC Group established ZGC Capital Corporation, a wholly-owned subsidiary based in Santa Clara, California.[932] Subsequently, in May 2016, the ZGC Innovation Center @ Silicon Valley, co-founded by ZGC Capital Corporation and the California-based fund C.M. Capital,[933] officially began operations in Silicon Valley.[934] The project is described by ZGC Capital Corporation as the "core of the Zhonggguancun overseas strategy," as a means of "advancing the going out of capital from Zhongguancun and the drawing in of advanced technology and talent," and as a way to use a "'fund plus incubator' model" in order to "guide and support projects to come to Zhongguancun for industrial application."[935] An article by *Xinhua News*, republished on the Chinese government's principal website, characterizes the ZGC Innovation Center @ Silicon Valley as "a strategic step" for Zhongguancun to establish a foreign presence and "leverage innovation resources."[936]

ZGC Capital Corporation has been actively engaged in Silicon Valley. To date, the company's investments there include Meta, an augmented reality platform; Everstring, a forecasting platform; and Optimizely, which helps corporate entities improve user conversion and activity.[937] ZGC Capital Corporation has also invested in a series of local Silicon Valley funds, including Danhua, Plug & Play, and KiloAngel.[938]

Ministry of Commerce, and the Beijing municipal government, […] has actively developed 'Drawing In' and 'Going Out' international science and technology exchange platforms […] [and has] actively explored and guided the internationalization development of China's science and technology incubators." *Overseas Parks* [Chinese], HANHAI HOLDINGS, http://www.hanhaiholding.com/overseas.aspx (last visited Jan. 11, 2018); *Hanhai Holdings* [Chinese], HANHAI HOLDINGS, http://www.hanhaiholding.com/ (last visited Jan. 11, 2018).

[930] English translation of Chinese term *yin jin lai*.

[931] *Zhongguancun Development Group Leaders Guidance Work Touring Zhongguancun Hanhai Science and Technology Park* [Chinese], HANHAI HOLDINGS, Jan. 3, 2014, http://www.hanhaiholding.com/newscon.aspx?id=80. *See also U.S. Silicon Valley Zhongguancun Hanhai Science and Technology Park* [Chinese], HANHAI HOLDINGS, http://www.hanhaiholding.com/overseascon.aspx?id=66 (last visited Jan. 11, 2018).

[932] *About Us*, ZGC CAPITAL CORPORATION, http://zgccapital.com/about-us/ (last visited Jan. 11, 2018).

[933] *Company Overview of CM. Capital Corporation*, BLOOMBERG, https://www.bloomberg.com/research/stocks/private/snapshot.asp?privcapId=3375306 (last visited Jan. 11, 2018) ("C.M. Capital Corporation is a private equity and VC arm of C.M. Capital (De) Inc. The firm also makes direct and indirect real estate investments. It also provides investment advisory services for various Cha Group affiliates. C.M. Capital Corporation was founded in 1969 and is based in Palo Alto, California.").

[934] *About Us* [Chinese], ZGC INNOVATION CENTER @ SILICON VALLEY, http://zgccapital.com/cn/about-us/. *See also Zhongguancun Silicon Valley Innovation Center to Build a Bridge of innovation and Cooperation for Sino-US Enterprises* [Chinese], PEOPLE'S DAILY, May 12, 2016, http://world.people.com.cn/n1/2016/0512/c1002-28346254.html.

[935] *About Us* [Chinese], ZGC INNOVATION CENTER @ SILICON VALLEY, http://zgccapital.com/cn/about-us/. *See also Zhongguancun Silicon Valley Innovation Center to Build a Bridge of innovation and Cooperation for Sino-US Enterprises* [Chinese], PEOPLE'S DAILY, May 12, 2015, http://world.people.com.cn/n1/2016/0512/c1002-28346254.html.

[936] *Zhongguancun Development Group Sets Up Innovation Center in Silicon Valley* [Chinese], XINHUA NEWS, May 12, 2016, http://www.gov.cn/xinwen/2016-05/12/content_5072814.htm.

[937] *Structure of Overseas Funds*, ZHONGGUANCUN CAPITAL, http://zgccapital.com/overseafund/.

[938] *Structure of Overseas Funds* [Chinese], ZHONGGUANCUN CAPITAL, http://zgccapital.com/overseafund/.

In parallel, the company has engaged in talent recruitment. For example, in September 2017, ZGC Innovation Center @ Silicon Valley held a "Beijing-Silicon Valley Talent and Technology Summit" in Santa Clara, attended by the Acting Mayor of Beijing Chen Jining and the PRC's San Francisco Consul General Luo Linquan. At the event, ZGC Capital Corporation described its ongoing efforts to identify overseas talent and technology that can "make a contribution to Beijing's science and technology innovation development."[939] Furthermore, ZGC Group maintains an active partnership with Stanford University.[940]

D. China's Acts, Policies, and Practices are Unreasonable

As Sections IV.A-IV.C confirm, China has engaged in a wide-ranging, well-funded effort to direct and support the systematic investment in, and acquisition of, U.S. companies and assets to obtain cutting-edge technology, in service of China's industrial policy. USTR finds these acts, policies, and practices to be unreasonable under 19 U.S.C. § 2411(b)(1).

The "unreasonable" conduct of a foreign government is defined as an act, practice, or policy as one that "while not necessarily in violation of, or inconsistent with, the international legal rights of the United States is otherwise unfair and inequitable."[941] In determining reasonableness, USTR also takes into account, to the extent appropriate, whether foreign firms in the United States are provided reciprocal opportunities to those denied U.S. firms.[942]

China's acts, policies, and practices are unreasonable because they are directed and supported by the government, and unfairly target critical U.S. technology with the goal of achieving dominance in strategic sectors. As discussed in Section IV.B, China has directed enterprises to pursue outbound investment with the express objective of acquiring and transferring technology. China has articulated this objective in numerous state planning documents and policies, in furtherance of both military and economic goals. China has also drawn on a range of tools to implement this approach – for instance, through the control that it exercises over SOEs, state-backed banks, and investment funds, and through its outbound investment approval regime.[943] As a result of these efforts, investments are often "politically driven and financially supported by Chinese government funds."[944] In short, the Chinese government has the means and authority to prevail (and does prevail) on Chinese firms on where to invest, what to invest, and how much to invest.

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[939] *Beijing Municipality Silicon Valley Talent and S&T Summit Held in the United States; Advances Synergies in Chinese and U.S. Innovation Resources* [Chinese], PEOPLE'S DAILY, Sept. 21, 2017, http://world.people.com.cn/n1/2017/0921/c1002-29550670.html.

[940] In May 2013, ZGC Group partnered with Stanford University to establish the Zhongguancun-Stanford New Emerging Technologies Innovation Investment Fund. This fund, established with Stanford physics professor Shoucheng Zhang, has raised $91.25 million to support innovative and disruptive technology projects from Stanford and Silicon Valley, and the funds are also to be used in cooperation with the Zhongguancun Development Group Silicon Valley International Incubation Center to guide and support technology projects to settle in Beijing's Zhongguancun. *Overseas Investment Platform* [Chinese], ZHONGGUANCUN GROUP, http://www.zgcgroup.com.cn/business/overseas_funds.html.

[941] 19 U.S.C. § 2411(d)(3)(A).

[942] 19 U.S.C. § 2411(d)(3)(D).

[943] See Section IV.B.

[944] WILEY REIN, *Submission, Section 301 Hearing* 4 (Sept. 28, 2017) (quoting Ryan Morgan, *Two Sessions: Made in China 2025*, APCO Forum (Mar. 26, 2017)).

In market-based transactions, economic actors generally look to maximize return on their investment in making foreign investment and acquisition decision. Firms looking to acquire and invest in a foreign country generally seek integration, synergy, and efficiencies from these transactions.[945]

Likewise, investment funds seek financial returns. With respect to sovereign wealth funds, the "Santiago Principles" set out widely recognized practices and principles, developed and supported by members of the International Working Group of Sovereign Wealth Funds, including China's China Investment Corporation (CIC). As described in the Santiago Principles,

> The [sovereign wealth fund's] investment decisions should aim to maximize risk-adjusted financial returns in a manner consistent with its investment policy, and based on economic and financial grounds.[946]

CIC ostensibly aims to "increase the return of China's currency reserve above that of sovereign debt holding."[947]

Market-based considerations, however, do not appear to be the primary driver of much of China's outbound investment and acquisition activity in areas targeted by its industrial policies. Instead, China directs and supports its firms to seek technologies that enhance China's development goals in each strategic sector.

Indeed, many of the Chinese firms that engage in overseas acquisitions in manufacturing do not appear to possess the firm-specific ownership advantages normally associated with acquiring firms, such as core technology, management and organizational skills, or brand names.[948] Instead, Chinese firms' comparative advantages rest with having a large domestic market and the support the government provides to Chinese outbound direct investment.[949]

The unreasonableness of China's acts, policies, and practices is also evident in the non-reciprocal treatment of U.S. firms and investment in China. As discussed in Section II, China's investment

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[945] *Chinese Investments in the United States: Impacts and Issues for Policymakers: Hearing Before the U.S.-China Econ. & Sec. Rev. Comm'n*, 115th Cong. 113 (2017) (statement of Robert D. Atkinson).

[946] INT'L WORKING GRP. ON SOVEREIGN WEALTH FUNDS, SOVEREIGN WEALTH FUNDS GENERALLY ACCEPTED PRINCIPLES AND PRACTICES: SANTIAGO PRINCIPLES 8 (2008).

[947] KEITH BLACK, CHARTERED ALTERNATIVE INV. ANALYST ASS'N, INVESTMENT STRATEGIES OF SOVEREIGN WEALTH FUNDS (2016); *see also CIC Culture Consensus*, CIC (Dec. 8, 2017), http://www.china-inv.cn/wps/portal/!ut/p/a1/jZJNb4JAEIZ_DVf2FQmgt60ffIlt0hpxLwYNriTAEtiWv19Ke2mio3ObyfNkJu8uEyxlos6-CpnpQtVZ-dML57iFg8niHRESvgb3sEpep1EY76wBONwFLN-2SH_l_PkLnwe2uwFgexbC5UuwdGcJEDrP-bhTHKQfgLx_BJ7aTwAP8tszQSKxTQP-h0sCv28wAlTII0ClSB45rIiYkKU6jV_mwOvT1JNMtPklb_PW_GyH8VXrppsbMND3vSmVkmVunlVl4JZyVZ1m6X-SNdVuqBRFWLxVe6_7Bm90WyA!/dl5/d5/L2dBISEvZ0FBIS9nQSEh.

[948] Bijiun Wang, Huiyao Wang, *Chinese Manufacturing Firms' Overseas Direct Investment (ODI): Patterns, Motivations and Challenges*, *in* RISING CHINA: CHALLENGES AND OPPORTUNITIES 100 (Jane Golley and Ligang Song ed. 2011), *available at* https://ssrn.com/abstract=1907170,105.

[949] Bijiun Wang, Huiyao Wang, *Chinese Manufacturing Firms' Overseas Direct Investment (ODI): Patterns, Motivations and Challenges*, *in* RISING CHINA: CHALLENGES AND OPPORTUNITIES 107 (Jane Golley and Ligang Song ed. 2011).

and administrative approval regime imposes substantially more restrictive requirements than the United States. U.S. firms face numerous barriers, such as sectoral restrictions, joint venture requirements, equity caps, and technology transfer requirements when they seek to access to the Chinese market. Chinese firms do not face anything remotely approaching these types of restrictions when investing in the United States.

Indeed, China's state-directed outbound investment regime works in tandem with its non-reciprocal treatment of U.S. firms. A recent study notes the following characteristics regarding China's strategic foreign acquisitions:

- To achieve its industrial policy objectives in a sector, China uses sovereign wealth funds and other state-backed actors to obtain foreign knowledge and expertise through foreign acquisitions;

- Foreign companies become more susceptible to Chinese acquisitions because of the difficult investment and market access environment in China; and

- Chinese firms are willing to bear losses in foreign markets both for their investments and sales as a cost of acquiring foreign proprietary technology, in part because the Chinese government will make up a portion of their loss.[950]

Certain participants in our investigation have asserted that Chinese firms invest in the United States based solely on commercial considerations, and that the Chinese government does not intervene in its firms' daily operations.[951] They assert that any technology and other intellectual property transferred during the merger and acquisition process is based on fair valuation and mutual assent of the parties.[952] Thus, in their view, China's policies and practices are not unreasonable.

These submissions are not persuasive. The above findings – based on a comprehensive assessment of government policies and investment transactions – leave no room for doubt concerning the role of the Chinese government. This is not to suggest that the Chinese government directs and supports every Chinese investment in the United States, but China's intervention has been decisive in transactions involving advanced technology in sectors that the government deems strategic.

The fact that many mergers and acquisition deals result in commercial advantages for the parties, as certain participants claim, does not negate these findings. The existence of possible mutual commercial benefit to the parties does not alter the reality that China directs and supports foreign investment in the United States to achieve industrial policy goals. In fact, China has begun

[950] *Chinese Investments in the United States: Impacts and Issues for Policymakers: Hearing Before the U.S.-China Econ. & Sec. Rev. Comm'n*, 115th Cong. 111 (2017) (statement of Robert D. Atkinson).
[951] CGCC, *Submission, Section 301 Hearing* 15 (Sep 28, 2017).
[952] CGCC, *Submission, Section 301 Hearing* 15 (Sep 28, 2017).

limiting "irrational" overseas investment to encourage outbound investment that "enhances China's technical standards, research and development."[953]

In sum, as one participant in the investigation has observed:

> No one can object to a country trying to increase its innovative capabilities or research productivity, but it is the methods China uses that are a problem….China aggressively pursues illicit technology transfer and intervenes to support Chinese firms against foreign competitors. Illicit acquisition of foreign technology has been promoted by the government policy since China opened its economy. The greater concern is that long standing Chinese practices on technology acquisition are now married to an aggressive, well-funded industrial policy.[954]

E. China's Acts, Policies, and Practices Burden U.S. Commerce

To be actionable, the unreasonable act, policy, or practice of a foreign country must burden or restrict U.S. commerce.[955] The acts, policies, and practices identified above burden U.S. commerce.

Under market conditions, FDI in the United States, including investment from China, benefits the U.S. economy. In the high-tech sector, FDI plays a critical role in the industry's growth, supports employment, and makes a significant contribution to research and development spending, exports, and value-added activities.[956] With respect to employment, one commentator notes that Chinese-owned firms in the United States have actually "ramped up local spending and employment because they benefit from abundant U.S. high-tech talent, clustering effects, freedom to innovate and the rule of law driving the American innovation environment."[957]

However, such benefits must be considered in the broader context of U.S. competitiveness in the global economy. As a general matter, FDI does not benefit the U.S. economy to the extent that it is directed to serve the Chinese government's industrial policy objectives – specifically, to acquire technology and build national champions within China – and is fueled by financial support not available in the private market.

Here, the Chinese government has directed and supported the acquisition of key U.S. companies and assets to promote technology transfer, in pursuit of both military and economic objectives. These acts, policies, and practices burden U.S. commerce in three ways.

First, China's acts, policies, and practices threaten the competitiveness of U.S. industry, especially in the sectors deemed important in China's industrial policy. As discussed in Section IV.B, China seeks to use foreign acquisitions and investments to upgrade its domestic industries

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[953] WILEY REIN, *Submission, Section 301 Hearing* 4 (Sep 28, 2017) (quoting *China Codifies Crackdown on 'Irrational' Outbound Investment*, BLOOMBERG (Aug. 18, 2017)).
[954] James Lewis, CSIS, *Submission*, *Section 301 Hearing* 5 (Sept. 27, 2017).
[955] 19 U.S.C. §2411(b)(1).
[956] *See High-Tech Industries: The Role of FDI in Driving Innovation and Growth 2017*, SELECTUSA, *available at* https://www.selectusa.gov/servlet/servlet.FileDownload?file=015t0000000U1eE.
[957] RHODIUM, *Submission, Section 301 Hearing* 5 (Sep 28, 2017).

and, ultimately, degrade, reduce, or replace U.S. competition in key sectors. These key sectors include the aviation, integrated circuits (IC), information technology (IT), biotechnology, industrial machinery and robotics, renewable energy, and automotive industries. Subsidies and other government policies and practices supporting Chinese outbound investment give Chinese firms an unfair advantage in acquiring technology assets abroad, which undermines U.S. firms' ability to compete in the global marketplace on a level playing field.

As a direct consequence of the Chinese government's unfair and market-distorting action, Chinese firms are expected to gain increased market share in these industries at the expense of U.S. firms, whose market share will decline in both U.S. and global markets.[958] The loss of market share could also force U.S. firms to shift their research and development programs, and other investment programs, into areas that may be less profitable and dynamic, which further erodes their long-term competitiveness. Moreover, the unprecedented scale of Chinese OFDI support policies suggest that Chinese firms will be able to gain significant market share at the expense of U.S. firms, threatening U.S. competitiveness in these high-technology industries.

In the IC sector, for example, China's National IC Fund has been used to support numerous technology-related outbound investments in the United States. The President's Council of Advisors on Science and Technology concluded that the "concerted push by China to reshape the market in its favor, using industrial policies backed by over one hundred billion dollars in government-directed funds, threatens the competitiveness of U.S. industry and the national and global benefits it brings."[959] Furthermore, if strategic foreign acquisitions lead to a dominant Chinese domestic semiconductor industry, downstream industries may do less business with U.S. firms, making it more difficult for them to survive over time. Indeed, the Mercator Institute assesses that "if Chinese enterprises prove capable of using this technology effectively, a hollowing out the technology leadership of industrial countries in pillar industries is possible."[960]

Second, China's acts, policies, and practices undermine the ability of U.S. firms to sustain innovation. In true market competition, foreign firms may often spur innovation and productivity spillovers to local economies when they bring technology and knowledge with them.[961] In this case, however, that does not appear to be happening. Unlike companies in prior waves of OFDI to the United States, "virtually all Chinese firms are less productive than their U.S. counterpart."[962] Chinese firms invest in the United States to learn from U.S. firms, not the

[958] *See* Ryan Morgan, *Two Sessions: Made in China 2025*, APCO Forum (Mar. 26, 2017) ("Businesses in China are not only facing competition from domestic firms that are slowly catching up, but also face the risk of Chinese firms acquiring their international competitor. A business that becomes Chinese through acquisition can then receive government support and other domestic advantages, potentially putting their foreign business competition at an immediate and severe competitive disadvantage both domestically and globally.")
[959] Wayne M. Morrison, CONG. RESEARCH. SERV., RL 33536, CHINA-U.S. TRADE ISSUES 65 (2017) (emphasis added).
[960] Jost Wübbeke, et. al., MERICS, MADE IN CHINA 2025: THE MAKING OF A HIGH-TECH SUPERPOWER AND CONSEQUENCES FOR INDUSTRIAL COUNTRIES 54 (Dec. 2016).
[961] *Chinese Investments in the United States: Impacts and Issues for Policymakers: Hearing Before the U.S.-China Econ. & Sec. Rev. Comm'n*, 115th Cong. 13 (2017) (statement of Robert D. Atkinson).
[962] *Chinese Investments in the United States: Impacts and Issues for Policymakers: Hearing Before the U.S.-China Econ. & Sec. Rev. Comm'n*, 115th Cong. 13 (2017) (statement of Robert D. Atkinson).

other way around.[963] This policy harms innovation by essentially transferring technologies from efficient and productive firms in the United States to less innovative and less productive firms in China. Such a policy, combined with government intervention and support in China, damages U.S. companies and harms global welfare.[964]

Third, China's acts, policies, and practices distort pricing with respect to investments in the critical market for IP-intensive sectors. As outlined above, the Chinese government provides extensive support to its firms in connection with foreign acquisitions. This support places U.S. competitors at a disadvantage by artificially inflating the prices of potential acquisition targets.[965] In other words, critical assets are not being sold and priced under true market conditions – a fact that threatens to distort the entire IP market. The result is that China is "exporting" its market-distorting policies to the United States and the world in critical high-technology industries.

Unlike China, the United States does not have a broad-based industrial policy through which the government directs and supports foreign investment by firms. Thus, U.S. technology enterprises are at a distinct competitive disadvantage, since they are forced to compete with the extensive support and intervention of the Chinese state.[966]

[963] *Chinese Investments in the United States: Impacts and Issues for Policymakers: Hearing Before the U.S.-China Econ. & Sec. Rev. Comm'n*, 115th Cong. 13 (2017) (statement of Robert D. Atkinson).
[964] Lee Branstetter, *Submission, Section 301 Hearing* 3 (Sept. 28, 2017).
[965] WILEY REIN, *Submission, Section 301 Hearing* 5 (Sep 28, 2017).
[966] WILEY REIN, *Submission, Section 301 Hearing* 5 (Sep 28, 2017).

V. Unauthorized Intrusions into U.S. Commercial Computer Networks and Cyber-Enabled Theft of Intellectual Property and Sensitive Commercial Information

A. Introduction

For over a decade, the Chinese government has conducted and supported cyber intrusions into U.S. commercial networks targeting confidential business information held by U.S. firms. Through these cyber intrusions, China's government has gained unauthorized access to a wide range of commercially-valuable business information, including trade secrets, technical data, negotiating positions, and sensitive and proprietary internal communications. These acts, policies, or practices by the Chinese government are unreasonable or discriminatory and burden or restrict U.S. commerce.

Section V.B of this report will first detail the cyber actions taken by the Chinese government against U.S. companies including the theft of confidential business information that would have provided a competitive economic advantage. Section V.B will then analyze how the Chinese government's cyber intrusions support its industrial policy goals and how this activity has continued in recent years. Section V.C concludes that China's actions are unreasonable and Section V.D explains the economic burden on and harm felt by targeted U.S. companies.

Experts have acknowledged that China's cyber activities represent a grave threat to U.S. competitiveness and the U.S. economy. Starting in 2008, experts expressed concern that China's cyber intrusions were becoming more frequent, more targeted, and more sophisticated.[967] As one expert has noted, "[w]hereas before the activities were targeted at government and military networks…, the new intrusions went beyond state-on-state espionage to threaten American technological competitiveness and economic prosperity."[968] The Office of the National Counterintelligence Executive added in 2011 that "Chinese actors are the world's most active and persistent perpetrators of economic espionage."[969]

As discussed in more detail below, evidence from U.S. law enforcement and private sources indicates that the Chinese government has used cyber intrusions to serve its strategic economic objectives. Documented incidents of China's cyber intrusions against U.S. commercial entities align closely with China's industrial policy objectives. As the global economy has increased its dependence on information systems in recent years, cyber theft became one of China's preferred methods of collecting commercial information because of its logistical advantages and plausible deniability.[970]

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[967] See *e.g.*, Shane Harris, *China's Cyber Militia*, NAT'L J., May 31, 2008. (citing remarks of a senior official from the U.S. Director of National Intelligence).

[968] HANNAS, ET AL., CHINESE INDUSTRIAL ESPIONAGE: TECHNOLOGY ACQUISITION AND MILITARY MODERNIZATION, 217 (2013).

[969] OFFICE OF THE NATIONAL COUNTERINTELLIGENCE EXECUTIVE, FOREIGN SPIES STEALING US ECONOMIC SECRETS IN CYBERSPACE: REPORT TO CONGRESS ON FOREIGN ECONOMIC COLLECTION AND INDUSTRIAL ESPIONAGE, 2009-2011 i (Oct. 2011).

[970] A number of public submissions provided to USTR state that the Chinese government has no reason to conduct cyber intrusions or commit cyber theft for commercial purposes, *see* CHINA GENERAL CHAMBER OF COMMERCE [*hereinafter* "CGCC"], *Submission, Section 301 Hearing* 16 (Sept. 28, 2017); that the US has not provided evidence of such actions by China, that China is also a target of cyberattacks, and that the two countries should work together

The Chinese and American presidents reached a commitment on refraining from the cyber-enabled theft of intellectual property (IP) and other confidential business information for commercial advantage in September 2015.[971] The United States has been closely monitoring China's cyber activities and the evidence indicates that China continues its policy and practice, spanning more than a decade, of using cyber intrusions to target U.S. firms to access their sensitive commercial information and trade secrets. For example, as described in more detail below, in September 2017 the U.S. Department of Justice filed an indictment against Chinese nationals for intruding into U.S. commercial networks and stealing commercially sensitive information. Cybersecurity firms have linked the firm for which these individuals worked to the Chinese government.[972]

Because cyber intrusions depend on deception and obfuscation, the acts, policies, and practices at issue by their nature impair the comprehensive collection and analysis of all relevant information. Businesses are often unaware that their computer networks have been compromised by an infiltration,[973] and those that are aware of such intrusions are often apprehensive about sharing publicly the details of any compromise. Accordingly, this report has drawn upon information in the public domain from both private parties and U.S. law enforcement. However, publicly available information necessarily represents only a fraction of all relevant activity.

B. China's Acts, Policies, and Practices Regarding Unauthorized Intrusions into U.S. Commercial Computer Networks and Cyber-Enabled Theft of Intellectual Property and Sensitive Commercial Information

1. The Chinese Government's Extensive Cyber Activities

The Chinese government's cyber intrusions into U.S. firms' networks have been well documented by private cybersecurity companies. For example, McAfee's 2011 *Night Dragon* report documents advanced persistent threat, or APT, activity from China against global oil, energy, and petrochemical companies "targeting and harvesting sensitive competitive proprietary operations and project-financing information with regard to oil and gas field bids and operations."[974]

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to address cybersecurity issues. *See* CHINA CHAMBER OF INTERNATIONAL COMMERCE [*hereinafter* "CCOIC"], *Submission, Section 301 Hearing* 68-70 (Sept. 39, 2017); CHINA CHAMBER OF COMMERCE FOR IMPORT AND EXPORT OF MACHINERY AND ELECTRONIC PRODUCTS [*hereinafter* "CCCME"], *Submission, Section 301 Hearing* 12 (Sept. 27, 2017). The discussion and accompanying references that follow establish a record of China's cyber intrusions and cyber theft. That China may also be a target of cyberattack is outside the scope of this investigation.

[971] Press Release, The White House, Fact Sheet: President Xi Jinping's State Visit to the United States (Sept. 25, 2015).

[972] INSIKT GROUP, *Recorded Future Research Concludes Chinese Ministry of State Security Behind APT3,* RECORDED FUTURE (May 17, 2017) (last visited Jan. 10, 2018).

[973] *See* VERIZON, 2017 DATA BREACH INVESTIGATIONS REPORT (2017).

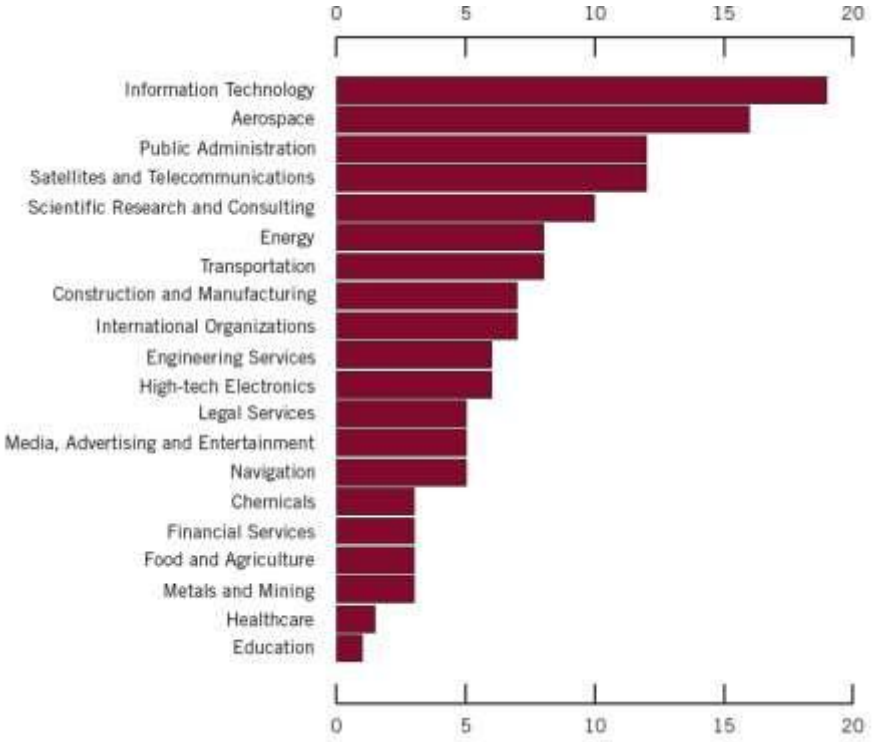
[974] MCAFEE FOUNDSTONE PROFESSIONAL SERVICES & MCAFEE LABS, GLOBAL ENERGY CYBER ATTACKS: "NIGHT DRAGON" 3 (Feb. 10, 2011).

Verizon's 2013 *Data Breach Investigations Report* concluded that "State-affiliated actors tied to China are the biggest mover in 2012. Their efforts to steal IP comprise about one-fifth of all breaches in this dataset." [975] Moreover, 95% of the espionage cases[976] in the dataset were attributed to threat actors in China, which "may mean that other threat groups perform their activities with greater stealth and subterfuge. But it could also mean that China is, in fact, the most active source of national and industrial espionage in the world today." [977]

In 2013, the cybersecurity firm Mandiant released a detailed report connecting the theft of hundreds of terabytes of data by China's People's Liberation Army (PLA) General Staff Department, Third Department (3PLA), Second Bureau— a signals intelligence component of the PLA, known by its Military Unit Cover Designation as Unit 61398[978] and referred to by Mandiant as "Advanced Persistent Threat 1" or "APT1."[979] At the time of the report, Mandiant estimated that Unit 61398 was "staffed by hundreds, and perhaps thousands of people based on the size of Unit 61398's physical infrastructure."[980] The report includes details on more than 3,000 indicators associated with APT1 and Mandiant's attribution of the cyber incidents to the 3PLA.[981]

[975] VERIZON, 2013 DATA BREACH INVESTIGATIONS REPORT 5 (2013) ("State-affiliated actors tied to China are the biggest mover in 2012. Their efforts to steal IP comprise about one-fifth of all breaches in this dataset.").
[976] The report defined this as "state-sponsored or affiliated actors seeking classified information, trade secrets, and intellectual property in order to gain national, strategic, or competitive advantage". VERIZON, 2013 DATA BREACH INVESTIGATIONS REPORT 11 (2013).
[977] VERIZON, 2013 DATA BREACH INVESTIGATIONS REPORT 21 (2013).
[978] MANDIANT, APT1: EXPOSING ONE OF CHINA'S CYBER ESPIONAGE UNITS 3 (2013); *see also* Mark Stokes, PROJECT 2049 INSTITUTE, THE PLA GENERAL STAFF DEPARTMENT THIRD DEPARTMENT SECOND BUREAU: AN ORGANIZATIONAL OVERVIEW OF UNIT 61398, 3-4 (July 27, 2015) ("Signals intelligence (SIGINT), or technical reconnaissance in PLA lexicon, advances the interests of the Chinese Communist Party (CCP) and the People's Republic of China (PRC). The PLA's SIGINT community consists of at least 28 technical reconnaissance bureaus (TRBs)… The Second Bureau (Unit 61398) is one of the largest among the 12 operational bureaus that comprise the GSD Third Department.").
[979] An "APT" or "Advanced Persistent Threat" uses multiple phases to break into a computer network, avoid detection, and harvest valuable information over the long term. *Advanced Persistent Threats: How They Work*, SYMANTEC, https://www.symantec.com/theme.jsp?themeid=apt-infographic-1 (last visited Jan. 10, 2018).
[980] MANDIANT, APT1: EXPOSING ONE OF CHINA'S CYBER ESPIONAGE UNITS 3 (2013).
[981] MANDIANT, APT1: EXPOSING ONE OF CHINA'S CYBER ESPIONAGE UNITS 5 (2013).

According to Mandiant, this unit of the 3PLA stole data from at least 141 organizations, 115 of which are based in the United States, representing 20 major business sectors. The victims of these intrusions match industries that China has identified as strategic priorities, including four of the seven "strategic emerging industries" that China identified in its 12th Five-year Plan.[982] The table below illustrates the number of 3PLA victims by sector in Mandiant's data set.



Source: MANDIANT APT1: EXPOSING ONE OF CHINA'S CYBER ESPIONAGE UNITS

Mandiant identified a wide range of commercial sector targets of 3PLA, including information technology, energy, financial services, food and agriculture, metals and mining, electronics, and chemicals. According to the report, 3PLA has stolen a wide range of sensitive commercial information from these victims including:

- product development and use, including information on test results, system designs, product manuals, parts lists, and simulation technologies;
- manufacturing procedures, such as descriptions of proprietary processes, standards, and waste management processes;
- business plans, such as information on contract negotiation positions and product pricing, legal events, mergers, joint ventures, and acquisitions;
- policy positions and analysis, such as white papers, and agendas and minutes from meetings involving high ranking personnel;
- e-mails of high-ranking employees; and

[982] MANDIANT, APT1: EXPOSING ONE OF CHINA'S CYBER ESPIONAGE UNITS 3, 24 (2013).

- user credentials and network architecture information.[983]

The Mandiant report suggests that a reasonable inference from the evidence it has collected is that intrusions conducted by this unit of the 3PLA supported commercial interests in China. For example, the report points to a company involved in a wholesale industry whose network was compromised by 3PLA for over two and half years. During this time, 3PLA reportedly stole countless files from the victim.[984] According to the report, the 3PLA unit repeatedly accessed the e-mail accounts of several executives, including the CEO and General Counsel.[985] The Mandiant report states that at the same time as these intrusions were occurring:

> [M]ajor news organizations reported that China had successfully negotiated a double-digit decrease in price per unit with the victim organization for one of its major commodities. This may be coincidental; however, it would be surprising if APT1 could continue perpetrating such a broad mandate of cyber espionage and data theft if the results of the group's efforts were not finding their way into the hands of entities able to capitalize on them."[986]

2. The United States Department of Justice Indicted Chinese Government Hackers in May 2014

In May 2014, the United States Department of Justice (DOJ) announced an indictment against five 3PLA officers for cyber intrusions and economic espionage directed against U.S. firms.[987] These five officers were assigned to 3PLA's Second Bureau, Unit 61398, which Mandiant had identified as APT1 the year prior.[988] The 3PLA officers were charged with cyber intrusions into the computer networks of six U.S. victims: Westinghouse Electric Company (Westinghouse), SolarWorld Americas, Inc. (SolarWorld), United States Steel Corporation (U.S. Steel), Allegheny Technologies, Inc. (ATI), Alcoa Inc. (Alcoa), and the United Steel, Paper and Forestry, Rubber, Manufacturing, Energy, Allied Industrial and Services Workers International Union (USW).[989]

The intrusions by the 3PLA were conducted at times when each of the victims had a significant business relationship or business issue with China.[990] In addition, each of the victims operate in a sector that the Chinese government has prioritized for development.[991] The indictment alleges

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[983] MANDIANT, APT1: EXPOSING ONE OF CHINA'S CYBER ESPIONAGE UNITS 25 (2013).
[984] MANDIANT, APT1: EXPOSING ONE OF CHINA'S CYBER ESPIONAGE UNITS 25 (2013).
[985] MANDIANT, APT1: EXPOSING ONE OF CHINA'S CYBER ESPIONAGE UNITS 25 (2013).
[986] MANDIANT, APT1: EXPOSING ONE OF CHINA'S CYBER ESPIONAGE UNITS 25 (2013).
[987] U.S. v. Wang Dong et al., (W. D. Pa. May 1, 2014) (Crim. No. 14-118 W.D.Pa.); *see also* Mark Stokes, PROJECT 2049 INSTITUTE, THE PLA GENERAL STAFF DEPARTMENT THIRD DEPARTMENT SECOND BUREAU: AN ORGANIZATIONAL OVERVIEW OF UNIT 61398, 3 (July 27, 2015).
[988] *See* Mark Stokes, PROJECT 2049 INSTITUTE, THE PLA GENERAL STAFF DEPARTMENT THIRD DEPARTMENT SECOND BUREAU: AN ORGANIZATIONAL OVERVIEW OF UNIT 61398 (July 27, 2015); *see also* MANDIANT, APT1: EXPOSING ONE OF CHINA'S CYBER ESPIONAGE UNITS 3 (2013).
[989] U.S. v. Wang Dong et al., 4-8 (W. D. Pa. May 1, 2014).
[990] U.S. v. Wang Dong et al., 13-26 (W. D. Pa. May 1, 2014).
[991] *See e.g.*, *The Plan for the Adjustment and Revitalization of the Steel Industry* (State Council, published Mar. 20, 2009); *12th Five-year Steel Industry Development Plan* (MIIT, Gong Xin Bu Gui [2011] No. 480, issued Oct. 24,

that "the defendants conspired to hack into American entities, to maintain unauthorized access to their computers and to steal information from those entities that would be useful to their competitors in China, including state-owned enterprises (SOEs)."[992] In some cases, the indictment alleges that the defendants stole trade secrets that "would have been particularly beneficial to Chinese companies at the time they were stolen."[993] In other cases, the indictment alleges that the defendants "stole sensitive, internal communications that would provide a competitor, or an adversary in litigation, with insight into the strategy and vulnerabilities of the American entity."[994] Meanwhile, during the period relevant to the cyber intrusions, the indictment states:

> Chinese firms hired the same PLA Unit where the defendants worked to provide information technology services. For example, one SOE involved in trade litigation against some of the American victims mentioned herein hired the Unit, and one of the co-conspirators charged herein, to build a 'secret' database designed to hold corporate 'intelligence'.[995]

a) SolarWorld

The indictment alleges that in 2012, while SolarWorld was litigating a petition it had filed against solar imports from China, the 3PLA stole thousands of sensitive files from SolarWorld. According to the indictment, these files included:

> (1) cash-flow spreadsheets maintained by the Chief Financial Officer that would enable a Chinese competitor to identify the length of time that SolarWorld might survive a financial or market shock; (2) detailed manufacturing metrics, technological innovations, and production line information that would enable a Chinese competitor to mimic SolarWorld's proprietary production capabilities without the need to invest time or money in research and development; (3) specific production costs for all manufacturing inputs that would enable a Chinese competitor to undermine SolarWorld financially through targeted and sustained underpricing of solar products; and (4) privileged attorney-client communications related to SolarWorld's ongoing trade litigation with

2011); *12th Five-year Solar Power Development Plan*, (NEA, Guo Neng Xin Neng [2012] No. 194, issued July 7, 2012); *Medium-Long Term Nuclear Power Development Plan* (NDRC, issued Oct. 2007).

[992] Press Release, Department of Justice, U.S. Charges Five Chinese Military Hackers for Cyber Espionage Against U.S. Corporations and a Labor Organization for Commercial Advantage (May 19, 2014), *available at* https://www.justice.gov/opa/pr/us-charges-five-chinese-military-hackers-cyber-espionage-against-us-corporations-and-labor.

[993] Press Release, Department of Justice, U.S. Charges Five Chinese Military Hackers for Cyber Espionage Against U.S. Corporations and a Labor Organization for Commercial Advantage (May 19, 2014), *available at* https://www.justice.gov/opa/pr/us-charges-five-chinese-military-hackers-cyber-espionage-against-us-corporations-and-labor.

[994] Press Release, Department of Justice, U.S. Charges Five Chinese Military Hackers for Cyber Espionage Against U.S. Corporations and a Labor Organization for Commercial Advantage (May 19, 2014), *available at* https://www.justice.gov/opa/pr/us-charges-five-chinese-military-hackers-cyber-espionage-against-us-corporations-and-labor.

[995] U.S. v. Wang Dong et al., 3 (W. D. Pa. May 1, 2014).

China, including confidential Question and Answer documents submitted to the Department of Commerce that were not discoverable by the Chinese respondents.[996]

According to DOJ, "such information would have enabled a Chinese competitor to target SolarWorld's business operations aggressively from a variety of angles.[997]

The indictment alleges that data were stolen from SolarWorld on at least twelve occasions, including during the following the incidents:

- On May 3 and May 9, 2012, the 3PLA stole files and e-mails from SolarWorld employees, including three senior SolarWorld executives.[998] The May 3 cyber intrusion occurred one day after the Coalition for American Solar Manufacturing led by SolarWorld issued a public analysis criticizing China's new Five-year Plan for Solar Photovoltaic Industry[999] and about two weeks before the U.S. Department of Commerce announced its preliminary determination in a trade complaint SolarWorld had filed against Chinese producers of solar cells.[1000]

- On July 27, 2012, the 3PLA stole e-mails and files belonging to five employees,[1001] just two days after SolarWorld's parent company filed a trade complaint with the European Commission against Chinese producers of solar modules and components.[1002]

- Between May 9 and September 26, 2012, the 3PLA conducted at least twelve more intrusions into and exfiltrations from SolarWorld's computers.[1003] The intrusion on September 26, 2012 occurred on the same day that SolarWorld filed a second trade complaint against Chinese solar products with the European

[996] U.S. v. Wang Dong et al., 18 (W. D. Pa. May 1, 2014).
[997] Press Release, Department of Justice, U.S. Charges Five Chinese Military Hackers for Cyber Espionage Against U.S. Corporations and a Labor Organization for Commercial Advantage (May 19, 2014), *available at* https://www.justice.gov/opa/pr/us-charges-five-chinese-military-hackers-cyber-espionage-against-us-corporations-and-labor.
[998] U.S. v. Wang Dong et al., 17, 34, 35 (W. D. Pa. May 1, 2014).
[999] COALITION FOR AMERICAN SOLAR MANUFACTURING, ANALYSIS: CHINA'S NEW FIVE-YEAR PLAN FOR SOLAR CALLS FOR ESCALATION IN GOVERNMENT SPONSORSHIP OF EXPORT-INTENSIVE, PRICE-SUBSIDIZED TRADE (May 2, 2012), *available at* http://www.americansolarmanufacturing.org/news-releases/05-02-12-chinas-five-year-plan.htm.
[1000] U.S. v. Wang Dong et al., 17 (W. D. Pa. May 1, 2014).
[1001] U.S. v. Wang Dong et al., 35 (W. D. Pa. May 1, 2014).
[1002] EU ProSun filed an anti-dumping complaint against certain photovoltaic products from China on July 25, 2012 with the European Commission. *See* European Commission, Notice of initiation of an anti-dumping proceeding concerning imports of crystalline silicon photovoltaic modules and key components (i.e. cells and wafers) originating in the People's Republic of China, 2012/C 269/04 (Sept. 9, 2012)
[1003] Fact Sheet, International Trade Administration, Department of Commerce, Commerce Finds Dumping and Subsidization of Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled into Modules from the People's Republic of China (2012), *available at* http://ia.ita.doc.gov/download/factsheets/factsheet_prc-solar-cells-ad-cvd-finals-20121010.pdf.

Commission,[1004] about one week before SolarWorld testified to the U.S. International Trade Commission about the harm caused by certain Chinese solar products,[1005] and two weeks before the U.S. Department of Commerce announced its final affirmative determination in its trade complaint against Chinese producers of solar cells.[1006]

As described more below in Part D, SolarWorld testified that these intrusions have resulted in significant harm to its business, including the loss of a competitive advantage and a loss of a return on its significant investment in a new solar technology.[1007]

b) U.S. Steel

According to the indictment, between February 8 and 23, 2010, 3PLA actors sent spearphishing e-mails with malware to U.S. Steel employees to gain unauthorized access to its network.[1008] On February 26, 2010, a 3PLA actor accessed at least one U.S. Steel computer and stole computer hostnames and descriptions for more than 1,700 U.S. Steel computers, including servers used for network security, applications for U.S. Steel employees' mobile devices, and physical access to U.S. Steel's facilities.[1009] The 3PLA actor then took steps to identify and exploit vulnerable servers on that list.[1010] In February 2010, at the same time as these cyber intrusions were occurring, U.S. Steel was a petitioner in two trade remedy investigations in the United States against imported steel products from China.[1011] The Chinese respondents named in these two

[1004] EU ProSun filed an anti-subsidies complaint against certain photovoltaic products from China on September 26, 2012 with the European Commission. *See* European Commission, *Notice of initiation of an anti-subsidy proceeding concerning imports of crystalline silicon photovoltaic modules and key components (i.e. cells and wafers), originating in the People's Republic of China*, 2012/C 340/06 (Nov. 8, 2012).

[1005] On October 3, 2012, the U.S. International Trade Commission held a hearing on the matter of certain photovoltaic products from China. *See* USITC, Inv. Nos. 701-TA-481 and 731-TA-1190, "Key Dates", *available at* https://www.usitc.gov/investigations/701731/2012/crystalline_silicon_photovoltaic_cells_and_modules/final.htm

[1006] On October 10, 2012, the U.S. Department of Commerce announced its affirmative final determinations in the antidumping and countervailing duty investigations of imports of certain photovoltaic cells from China. *See* Fact Sheet, INTERNATIONAL TRADE ADMINISTRATION, DEPARTMENT OF COMMERCE, *Commerce Finds Dumping and Subsidization of Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled into Modules from the People's Republic of China* (2012).

[1007] Juergen Stein, SOLARWORLD AMERICAS INC. [*hereinafter* "SolarWorld"], *Testimony*, *Section 301 Hearing* 76 (Oct. 10, 2017).

[1008] U.S. v. Wang Dong et al., 20 (W. D. Pa. May 1, 2014). "In a spear-phishing attack, a target recipient is lured to either download a seemingly harmless file attachment or to click a link to a malware- or an exploit-laden site. The file, often a vulnerability exploit, installs a malware in a compromised computer. The malware then accesses a malicious command-and-control (C&C) server to await instructions from a remote user. At the same time, it usually drops a decoy document that will open when the malware or exploit runs to hide malicious activity." TREND MICRO INC., SPEAR-PHISHING EMAIL: MOST FAVORED APT ATTACK BAIT, RESEARCH PAPER 2012 (2012), *available at* http://www.trendmicro.com/cloud-content/us/pdfs/security-intelligence/white-papers/wp-spear-phishing-email-most-favored-apt-attack-bait.pdf.

[1009] U.S. v. Wang Dong et al., 21 (W. D. Pa. May 1, 2014).

[1010] U.S. v. Wang Dong et al., 21 (W. D. Pa. May 1, 2014).

[1011] These two cases involved oil country tubular goods (OCTG), which are steel piping used by oil and gas companies and seamless standard line pipes (SSLP), which are steel pipes specifically constructed without a welded seam down the length of the pipes. *See* Department of Commerce, ITA Case No. A-570-943, A-570-956, and C-570-957.

investigations include the operating companies of several Chinese SOEs, including the Baosteel Group.[1012]

In U.S. Steel's submission to USTR in connection with this investigation, U.S. Steel explains that the second hack "resulted in the exfiltration of highly sensitive commercial secrets regarding [its] development of lightweight, high-strength steel."[1013] U.S. Steel responded by filing claims under Section 337 of the Trade Act before the U.S. International Trade Commission (USITC) against Baosteel, which it claims "was known to be one of the beneficiaries of China's state-sponsored cyber-attacks."[1014]

c) ATI

According to the indictment, on April 13, 2012, the 3PLA actors stole usernames and passwords for thousands of ATI employees.[1015] The stolen network credentials would have provided wide-ranging access to the company's computers and sensitive information.[1016] In 2012, ATI was engaged in a joint venture with Baosteel in Shanghai, which manufactures precision rolled stainless steel strips.[1017] On April 12, 2012, one day before the 3PLA exfiltrated these credentials, ATI officials met with officials from Baosteel in Shanghai for a board meeting[1018] related to their joint venture.

d) United Steel Workers (USW)

According to the indictment, the 3PLA stole sensitive information from USW computer networks on two separate occasions.[1019]

The indictment alleges that in January 2012, at the same time that USW was preparing a public campaign to counter what it viewed as a wide array of unfair Chinese government policies, 3PLA stole sensitive information from USW computer networks.[1020] On January 31, 2012, USW issued a statement from its International President, calling on the U.S. Government to take action to protect the U.S. automobile and auto parts industry from "China's predatory, protectionist and

[1012] Baosteel Group (now known as Baowu Steel) is a state-owned enterprise wholly-owned by China's State-owned Assets Supervision and Administration of Commission. *See* SASAC website for the full list, *available at* http://www.sasac.gov.cn/n2588035/n2641579/n2641645/index.html (last visited Jan. 23, 2018).
[1013] U.S. STEEL CORPORATION, *Submission, Section 301* Hearing (Sept. 28, 2017).
[1014] U.S. STEEL CORPORATION, *Submission, Section 301 Hearing* (Sept. 28, 2017).
[1015] U.S. v. Wang Dong et al., 22-3 (W. D. Pa. May 1, 2014).
[1016] U.S. v. Wang Dong et al., 21-3 (W. D. Pa. May 1, 2014).
[1017] *See Global Joint Ventures – Shanghai STAL Precision Stainless Steel Co., Ltd (STAL)*, ATI, *available at* https://www.atimetals.com/businesses/joint-ventures/Pages/default.aspx. *See also* Allegheny Technologies Incorporated, 2012 Form 10-K.
[1018] U.S. v. Wang Dong et al., 21-3 (W. D. Pa. May 1, 2014). Two months prior to this intrusion, the joint venture announced it was selling off its loss-making stainless steel assets to the Baosteel Group, its parent company for RMB 2.6 billion. The sale of assets to the Baosteel Group was the largest M&A transaction in China announced that month. See BAOSHAN IRON AND STEEL LTD. RELATED PARTY TRANSACTIONS REPORT. Report No. 2012-005, 24 (Feb. 29, 2012); See MIIT, MERGER AND RESTRUCTURING MONTHLY REPORT, VOL. 2, *available at* http://merger.miit.gov.cn/observation/briefing/2012-03-23/381.html.
[1019] U.S. v. Wang Dong et al., 7 (W. D. Pa. May 1, 2014).
[1020] U.S. v. Wang Dong et al., 23 (W. D. Pa. May 1, 2014)

illegal trade practices."[1021] USW through its trade counsel also released a report on Chinese auto policies that threaten the U.S. jobs in the auto industry on January 31, 2012.[1022] Meanwhile, on the same day, the 3PLA gained unauthorized access to USW computers, and stole e-mails from six senior USW employees, including USW's International President, most of whom were personally and publicly involved in formulating USW strategy towards combatting China's trade practices in this sector.[1023]

On March 7, 2012, 3PLA actors again gained unauthorized access to USW employees' e-mails[1024] at a critical period for USW as it was considering whether to request an extension of tariffs imposed on Chinese tires that would expire in September 2012.[1025] USW announced in September 2012 that it would not seek an extension of the tariffs, but revealed in its September announcement that it had notified the Administration in March that it would not seek an extension.[1026] The 3PLA stole e-mails from the inboxes of six senior employees that included sensitive, non-public, and deliberative information about USW trade strategy, including its decision not to seek an extension of the tariffs, which would not be announced publicly for another six months.[1027]

e) Westinghouse

Westinghouse was affected by four major cyber intrusions by the 3PLA – one occurring in May 2010, one in late December 2010, and two in early January 2011.[1028] According to the indictment, the PLA obtained at least 1.4 gigabytes of data, the equivalent of roughly 700,000 pages of e-mail messages and attachments from Westinghouse's computers,[1029] including: trade secrets; technical and design specifications; network credentials; and, sensitive e-mails belonging to senior decision-makers.[1030]

In 2010, Westinghouse was building four AP1000 power plants in China and negotiating other terms of the construction, including technology transfers, with State Nuclear Power Technology

[1021] U.S. v. Wang Dong et al., 24 (W. D. Pa. May 1, 2014)
[1022] *See* Statement of Terence Stewart, Jan. 31, 2012 available at: http://assets.usw.org/releases/china-trade/Final-SS-Press-Release.pdf. See *also* LAW OFFICES OF STEWART & STEWART, CHINA'S SUPPORT PROGRAMS FOR AUTOMOBILES AND AUTO PARTS UNDER THE 12TH FIVE YEAR PLAN (Jan. 2012).
[1023] U.S. v. Wang Dong et al., 24-5 (W. D. Pa. May 1, 2014).
[1024] U.S. v. Wang Dong et al., 25 (W. D. Pa. May 1, 2014).
[1025] Imported Chinese tires became subject to a tariff for a period of three years starting on September 26, 2009, after the USW successfully petitioned the USITC for relief. *See Certain Passenger Vehicle and Light Truck Tires from the People's Republic of China*, Investigation No. TA-421-7, USITC Publication No. 4085.
[1026] USW announced on September 24, 2016 that it would not seek an extension of the tariffs. *USW Acclaim Success of Trade Relief for Tire Sector; Extension Not Requested*, UNITED STEELWORKERS (Sept. 24, 2012), available at: http://www.usw.org/news/media-center/releases/2012/usw-acclaim-success-of-trade-relief-for-tire-sector-extension-not-requested. The USW announcement states that it notified the Administration of its decision in March before the renewal request deadline
[1027] U.S. v. Wang Dong et al., 25-6 (W. D. Pa. May 1, 2014).
[1028] U.S. v. Wang Dong et al., 4, 15-6. (W. D. Pa. May 1, 2014).
[1029] U.S. v. Wang Dong et al., 16 (W. D. Pa. May 1, 2014).
[1030] U.S. v. Wang Dong et al., 2, 4, 15-6 (W. D. Pa. May 1, 2014).

Corporation (SNPTC), a Chinese SOE.[1031] At the same time, a 3PLA actor stole confidential and proprietary technical and design specifications for pipes, pipe supports, and pipe routing within the AP1000 plant buildings.[1032] The stolen trade secrets and technical information would permit a competitor to build a power plant without having to invest in associated research and development costs that had been borne by Westinghouse in the past.[1033]

Additionally, in 2010 and 2011, while Westinghouse was exploring other business ventures with SNPTC, a 3PLA actor stole sensitive, non-public, and deliberative e-mails belonging to senior decision-makers responsible for the Westinghouse business relationship with SNPTC.[1034] In January 2011, as the 3PLA were infiltrating Westinghouse's servers and exfiltrating its information, Westinghouse announced the signing of two agreements with SNPTC.[1035]

f) Alcoa

The indictment alleges that on February 1, 2008, Alcoa announced that it was entering into a partnership with a Chinese SOE, Chinalco to acquire an interest in a foreign mining company.[1036] After the announcement, on February 20, 2008, the 3PLA obtained access to nearly 3,000 Alcoa e-mails through a spearphishing message that installed malware into Alcoa's computer system.[1037] The stolen e-mails included internal discussions among Alcoa's senior managers regarding the acquisition of the foreign mining company.[1038]

The facts of each of these incidents provides a chilling warning to U.S. companies that engage or seek to engage in business in China or seek to challenge China's trade practices through legal means. If a company operates in a sector that China deems strategic to its economic interests or particularly if it has business relations with an SOE, the company must risk being targeted by Chinese government hackers for cyber intrusions and cyber theft, putting sensitive commercial information about its products, business strategy, and other matters at risk. These firms are forced to operate on the assumption that they are under constant surveillance by the Chinese government's extensive system of corporate surveillance and control, which is discussed in greater detail in Section VI of this report.[1039]

[1031] U.S. v. Wang Dong et al., 14 (W. D. Pa. May 1, 2014); *see also China signs first engineering contracts for Westinghouse AP1000-derived CAP1400 reactor*, POWER ENGINEERING, Nov. 29, 2010. *Foreign Companies Eyeing Chinese Nuclear Power Market*, SINOCAST, COMTEX NEWS NETWORK, Dec. 2, 2010; *First Concrete Pour for Haiyang Unit 2 Completed in Record Time; 4 AP1000 Units Now Under Construction in China*, PR NEWSWIRE, June 25, 2010.
[1032] U.S. v. Wang Dong et al., 14-5 (W. D. Pa. May 1, 2014).
[1033] U.S. v. Wang Dong et al., 14-5 (W. D. Pa. May 1, 2014).
[1034] U.S. v. Wang Dong et al., 16 (W. D. Pa. May 1, 2014)
[1035] *Westinghouse, China extend AP1000 reactor agreement*, POWER ENGINEERING, Jan. 20, 2011, *available at* http://www.power-eng.com/articles/2011/01/westinghouse--china.html.
[1036] U.S. v. Wang Dong et al., 26 (W. D. Pa. May 1, 2014); *see also* Eric Onstad, Lucy Hornby, *Chinalco and Alcoa buy stake in Rio Tinto*, NY TIMES (Feb. 1, 2008).
[1037] U.S. v. Wang Dong et al., 26-7 (W. D. Pa. May 1, 2014).
[1038] U.S. v. Wang Dong et al., 27 (W. D. Pa. May 1, 2014).
[1039] Andrew Browne, *China's Big Brother Is Watching You Do Business*, WALL STREET J., May 23, 2017.

3. China's Institutional Framework Supports Cyber Intrusions into U.S. Commercial Networks

As discussed in detail in other sections of this report, China relies primarily on a state-led approach to technology development and economic growth.[1040] Through an extensive planning system, China identifies certain sectors and technologies for development and fosters national champions to achieve dominance in both domestic and global markets.[1041] China's industrial plans and innovation goals, such as Made in China 2025,[1042] aim to provide support and assistance through the use of state resources to Chinese companies and commercial sectors.[1043] At the same time, China maintains an extensive state sector and uses state-invested enterprises and other mechanisms as instruments to achieve the government's economic objectives.

As noted above in Section IV.B.5, China's policy of "military-civil fusion" calls for the development of integrated information sharing platforms to facilitate science and technology (S&T) resource sharing and collaboration between state laboratories, the PLA, and enterprises.[1044] China's government-directed cyber capabilities exist alongside an institutional framework that provides state-invested enterprises and national champions with privileged access to various forms of Chinese government support and information.

Indeed, the U.S. government has evidence that the Chinese government provides competitive intelligence through cyber intrusions to Chinese state-owned enterprises through a process that includes a formal request and feedback loop, as well as a mechanism for information exchange via a classified communication system.

For example, according to U.S. government information, China National Offshore Oil Corporation (CNOOC), a state-owned enterprise, submitted formal requests to Chinese intelligence services seeking intelligence information on several U.S. oil and gas companies and on U.S. shale gas technology. One instance occurred in January 2012 in the context of commercial negotiations between a U.S. company ("U.S. Company 1"), CNOOC, and the PRC Ministry of Agriculture regarding oil leaks that had occurred at a facility jointly owned and operated by U.S. Company 1 and CNOOC in June 2011.

[1040] *See* Section I.C.
[1041] *See* Section I.C.
[1042] See Section I.C for more information on the Made in China 2025 policy.
[1043] For example, China's Made in China 2025 policy documents set out targets for developing ten key industries. U.S. CHAMBER OF COMMERCE, MADE IN CHINA 2025: GLOBAL AMBITIONS BUILT ON LOCAL PROTECTIONS 17-18 (2017) (stating that the policy "appears to provide preferential access to capital to domestic companies to promote their indigenous [research and development] capabilities, enhance their competitiveness, and support their ability to acquire technology from abroad."). U.S. CHAMBER OF COMMERCE, MADE IN CHINA 2025: GLOBAL AMBITIONS BUILT ON LOCAL PROTECTIONS 6 (2017) ("In concert with the 13th Five-Year Plan, Internet Plus Action Plan, and other state-led development plans, [Made in China 2025] constitutes a broader strategy to use state resources to alter and create comparative advantage in these sectors on a global scale."). EUROPEAN CHAMBER OF COMMERCE IN CHINA, CHINA MANUFACTURING 2025: PUTTING INDUSTRIAL POLICY AHEAD OF MARKET FORCES 1 (2017) (stating that the policy's references to "'indigenous innovation'—along with mentions of the need to realise 'self-sufficiency' . . . suggests that Chinese policies will further skew the competitive landscape in favour of domestic companies.").
[1044] *See Description of National New Industrial Demonstration Base*, MIIT, http://sfjd.miit.gov.cn/BaseInfoAction!findListIndustry.action

In January 2012, these Chinese intelligence services provided CNOOC information ahead of and during negotiations with U.S. Company 1. The information that the intelligence services provided to CNOOC included details on U.S. Company 1's position in the negotiation. CNOOC attributed their ultimate success in the negotiation with U.S. Company 1 to the information that CNOOC had received from the intelligence services. According to information the U.S. Government has access to, senior Chinese Intelligence officials, including a PLA director, Liu Xiaobei, endorsed the use of the intelligence information during CNOOC's negotiations with U.S. Company 1.

In a second instance, in July 2012, CNOOC requested that Chinese Intelligence provide specific information on five named U.S. oil and natural gas companies. Specifically, CNOOC sought information on:

> -U.S. Company 2's operations, asset management, and the movements of its senior personnel;
>
> -U.S. Company 3's developments in shale gas technology; and
>
> -The status of U.S. Company 4 and U.S. Company 5's research in certain areas, including lab procedures, fracking technology and fracking formulae.

These examples illustrate how China uses the intelligence resources at its disposal to further the commercial interests of Chinese state-owned enterprises to the detriment of their foreign partners and competitors.

Available evidence also indicates that China uses its cyber capabilities as an instrument to achieve its industrial policy and S&T objectives. Indeed, based on available information on China's cyber intrusions, experts have concluded that China's cyber intrusions and cyber theft align with its industrial policy goals.[1045] For example:

> As noted above, Mandiant observed in its 2013 report that "organizations in all industries related to China's strategic priorities are potential targets of APT1's comprehensive cyber espionage campaign." The victims of the intrusions in Mandiant's data set match

[1045] During the hearing for this investigation, Richard Ellings of the Commission on the Theft of American Intellectual Property and the President of the National Bureau of Asian Research, was asked whether there is a correlation between China's industrial plans and reported cyber intrusions directed against U.S businesses. Mr. Ellings testified in response: "Absolutely. In fact, the whole history of cyber intrusions and more broadly industrial espionage from China correlates with all the Five-year Plans, the Indigenous Innovation Policy that came out 10 years ago, 12 years ago, 11 years ago, current Five-year Plan, 2025 Plans. This is, as I said, kind of a standard that is given out to the country and to accomplish the goals set out in these plans becomes a measure by which cadres and entities throughout the country, their performance is measured. So they have tremendous incentive. So all of our tracking, whether they be through the court cases that make it into the public realm, whether cyber intrusion surveys and studies, Verizon did one, the Mandiant one, and so on, they all show a correlation between the priorities of the Chinese government at any time and the kinds of industrial espionage undertaken." Richard Ellings, COMMISSION ON THE THEFT OF AMERICAN INTELLECTUAL PROPERTY [*hereinafter* "IP Commission"], *Testimony*, *Section 301 Hearing* 51 (Oct. 10, 2017).

industries that China has identified as strategic priorities in its five year plan and S&T development plans.[1046]

In a review of cybertheft by a group associated with China's intelligence services, cybersecurity firm Novetta found the group targeting entities including Fortune 500 companies and firms with innovative information technology.[1047] Such targeting converged with China's strategic interests and the aims of China's 11th Five Year plan for the 2006-2011 period.[1048]

In 2015, one cybersecurity expert testified to the U.S.-China Economic and Security Review Commission that "China's commercial cyber espionage activity likely supports Communist Party central planning policies designed to provide a competitive advantage for Chinese companies."[1049]

SolarWorld, in its submission to USTR, stated: "In our view, Chinese hacking and technology theft is pervasive and encouraged by the Chinese Government, as demonstrated by the 2014 indictment of the Chinese People's Liberation Army and as driven by China's Five Year Plans, which target specific high-tech and developing industries."[1050]

The 3PLA's cyber theft of trade secrets from Westinghouse, documented in the DOJ indictment, is illustrative of how China uses cyber theft as one of multiple instruments to achieve its state-led technology development goals. During China's 12th Five-year planning period (2011-2015), China issued several documents demonstrating its commitment to developing "indigenous" nuclear power technology capabilities. For example, the *12th Five-year Science and Technology Development Plan* expressly states that China should "comprehensively master" Westinghouse's AP1000 nuclear power design technology and "indigenously" complete standard designs at domestic facilities.[1051] The plan also states that China should establish demonstration power plants for CAP1400 technology, which is China's domestic nuclear design technology based on Westinghouse's AP1000 design with its input.[1052] In addition, China's *12th Five-year Energy Technology Development Plan* contains specific references to developing the AP1000 and similar technologies through a process of "indigenization with outside support."[1053]

[1046] MANDIANT, APT1: EXPOSING ONE OF CHINA'S CYBER ESPIONAGE UNITS 24 (2013).
[1047] NOVETTA, OPERATION SMN: AXIOM THREAT ACTOR GROUP REPORT 4, 8-9 (2014). Such innovative technology includes telecommunications equipment manufacturers, infrastructure providers, integrated circuit manufacturers, software vendors, pharmaceutical and cloud computing companies, networking equipment manufacturers, and energy firms.
[1048] NOVETTA, OPERATION SMN: AXIOM THREAT ACTOR GROUP REPORT 9-10 (2014).
[1049] *Hearing on Commercial Cyber Espionage and Barriers to Digital Trade in China: Hearing Before the U.S.-China Econ. & Sec. Rev. Comm'n* (June 15, 2015) (Statement of Jen Weedon), *available* at https://www.uscc.gov/sites/default/files/Weedon%20Testimony.pdf; *see also* Richard J. Ellings, IP COMMISSION, *Submission*, *Section 301 Hearing* 3-4 (Sept. 28, 2017); *but see* James Lewis, CENTER FOR STRATEGIC AND INTERNATIONAL STUDIES [*hereinafter* "CSIS"], *Submission, Section 301 Hearing* 4 (Sept. 2017).
[1050] SOLARWORLD, *Submission*, *Section 301 Hearing* 2 (Oct. 20, 2017).
[1051] *Notice on Issuing the 12th Five-year Science and Technology Development Plan (2011-2015)* § 3, Item 6 (MOST, Guo Ke Fa Ji [2011] No. 270, issued July 4, 2011).
[1052] *Notice on Issuing the 12th Five-year Science and Technology Development Plan (2011-2015)* § 3, Item 6 (MOST, Guo Ke Fa Ji [2011] No. 270, issued July 4, 2011).
[1053] *12th Five-year Plan for Energy Technology (2011-2015)*, § 2.2, § 4.3 (NEA, issued Dec. 2011).

For Westinghouse to operate in China, Westinghouse was required to invest through a joint venture controlled by an SOE,[1054] SNPTC, and in order to win the bid it had to agree to transfer all relevant technology for the AP1000 to the SOE.[1055] This circumstance is hardly unique to Westinghouse. Section II of this report details how China uses its restrictive foreign investment regime to put pressure on U.S. companies to transfer technology to Chinese enterprises, often state-owned enterprises. As described above, according to the DOJ indictment, 3PLA actors stole thousands of files from Westinghouse's computers, including: trade secrets; technical and design specifications; network credentials; and sensitive e-mails belonging to senior decision-makers, while commercial negotiations between Westinghouse and SNPTC were ongoing.[1056]
In sum, China first expressly identified through its industrial policies a U.S. technology that China sought to indigenize. China then required technology transfer to an SOE in order for the U.S. company holding the technology to be able to access the China market. China then used its cyber capabilities to steal commercially sensitive information, including trade secrets, negotiating positions and technical designs, from the U.S. company that could provide the SOE with an advantage in its business dealings with the U.S. company.

4. China's Recent Cyber Intrusion Activities Against U.S. Commercial Networks

Beginning in 2014, the United States began stepping up pressure on China for its cyber intrusions into U.S. firms and the theft of commercial information through a number of mechanisms. In September 2015, then-U.S. President Obama and Chinese President Xi reached a commitment that "neither country's government will conduct or knowingly support cyber-enabled theft of intellectual property, including trade secrets or other confidential business information, with the intent of providing competitive advantages to companies or commercial sectors."[1057] The United States has been closely monitoring China's cyber activities since this

[1054] See e.g., *Catalogue of Industries for Guiding Foreign Investment*, (2007 Amendment) (NDRC, MOC Order No. 57, issued Oct. 31, 2007) , Part IV, para. 4 "Catalogue of Restricted Industries for Foreign Investment."
[1055] *Westinghouse Wins Nuclear Power Bid*, CHINA DAILY, Dec. 27, 2006 ("According to the [chief representative of Westinghouse China], the company's success can be mainly attributed to three factors: advanced technology, competitive pricing and an offering of all-round technology transfer… [The CEO of] Westinghouse, earlier told China Daily that Westinghouse will fully co-operate with its Chinese customers to transfer all technology as requested"); *See Foreign Companies Eyeing Chinese Nuclear Power Market*, SINOCAST, COMTEX NEWS NETWORK, Dec. 2, 2010 (Westinghouse delivered "more than 75,000 pieces of documents to Chinese customers as part of a technology transfer agreement, hoping to consolidate its leading status in the world's largest nuclear power market. The World Nuclear Association (WNA) believes that it is just because Westinghouse Electric agrees to transfer technology in its contracts with Chinese customers that it successfully wins the bid to build AP1000 nuclear reactors in China.").
[1056] U.S. v. Wang Dong et al. at 4.
[1057] Press Release, The White House, Fact Sheet: President Xi Jinping's State Visit to the United States (Sept. 25, 2015), https://obamawhitehouse.archives.gov/the-press-office/2015/09/25/fact-sheet-president-xi-jinpings-state-visit-united-states. DOJ reaffirmed the 2015 joint statement in October 2017: "Both sides will continue their implementation of the consensus reached by the Chinese and American Presidents in 2015 on U.S.-China cybersecurity cooperation… [including] (2)that neither country's government will conduct or knowingly support cyber-enabled theft of intellectual property, including trade secrets or other confidential business information, with the intent of providing competitive advantage to companies or commercial sectors[.]" *See* Press Release, First U.S.-China Law Enforcement and Cybersecurity Dialogue (Oct. 6, 2017), *available at* https://www.justice.gov/opa/pr/first-us-china-law-enforcement-and-cybersecurity-dialogue.

consensus was reached, and the evidence indicates that cyber intrusions into U.S. commercial networks in line with Chinese industrial policy goals continue.

Beijing's cyber espionage against U.S. companies persists and continues to evolve. The U.S. Intelligence Community judges that Chinese state-sponsored cyber operators continue to support Beijing's strategic development goals, including its S&T advancement, military modernization, and economic development.

In September 2017, the DOJ filed an indictment against three Chinese nationals who "were owners, employees and associates of the Guangzhou Bo Yu Information Technology Company Limited[1058] (Boyusec), a company that cybersecurity firms have linked to the Chinese government.[1059] Three firms, all with operations in the United States, are named in the indictment as victims: Moody's Analytics, Siemens AG, and Trimble Inc. The cyber intrusions against Trimble continued until March 2016 (and the related conspiracy which continued until "at least May 2017"[1060]), targeted the three named firms to steal confidential business and commercial information and work product.[1061]

Specifically, in 2015 and 2016, Trimble was working to develop a new global navigation satellite systems product that "combined software with a relatively low cost antenna to significantly improve the positioning accuracy of mobile devices"[1062] (Commercial GNSS Project). "Beginning no later than December 2015, and continuing through March 2016, the co-conspirators targeted the servers within Trimble's network," and by the middle of January 2016 the hackers had "accessed Trimble's network and copied, packaged, and stole computer files containing commercial business documents and data" related to the GNSS project."[1063] In addition to the theft of market research and strategy information, the stolen files also included "confidential and proprietary schematic design for the hardware receiver equipment"[1064] and "two directory lists […] listed files containing the names of a Trimble engineer related to the Commercial GNSS Project."[1065] "In total, conspirators stole at least 275 megabytes of data, including compressed data, which included hundreds of files that would have assisted a Trimble competitor in developing, providing, and marketing similar software and subscriptions services, without incurring millions of dollars in research and development costs."[1066] According to the

[1058] U.S. v. Wu Yingzhou et al., (September 13, 2017) (Crim. No. 17-247 W.D.Pa.).
[1059] There have been many public reports linking the firm Boyusec with China's Ministry of State Security (MSS) and/or the PLA's cyber unit. For example, a report from a private cybersecurity firm, Recorded Future, published on May 17th, 2017, links Boyusec to the Chinese Ministry of State Security. The report alleges that the known threat actor group "APT3" is in fact Boyusec and is directly linked to the Chinese state. Insikt Group, *Recorded Future Research Concludes Chinese Ministry of State Security Behind APT3,* RECORDED FUTURE, May 17, 2017 (linking these attacks to the MSS). *See also Siemens, Trimble, Moody's breached by Chinese Hackers, U.S. Charges,* REUTERS, Nov. 27, 2017 (linking Boyusec hacks to the PLA).
[1060] U.S. v. Wu Yingzhou et al., at 3.
[1061] U.S. v. Wu Yingzhou et al., at 3-9.
[1062] U.S. v. Wu Yingzhou et al., at 7.
[1063] U.S. v. Wu Yingzhou et al., at 8.
[1064] U.S. v. Wu Yingzhou et al., at 8.
[1065] U.S. v. Wu Yingzhou et al., at 9.
[1066] U.S. v. Wu Yingzhou et al., at 9.

indictment, intended customers of the Commercial GNSS Project included construction, land survey, and agricultural sectors and the technology had no military applications.[1067]

Similarly, U.S. cybersecurity firms have concluded that cyber intrusions against U.S. firms by Chinese state-sponsored and supported hackers since September 2015 have decreased or become more difficult to detect, but none has concluded that the activity has ceased entirely.[1068] In June 2016, the cybersecurity firm FireEye[1069] stated in a report that while cyber intrusions appear to be less voluminous, the attacks appear to now be more focused.[1070] According to the report, FireEye observed 262 cyber intrusions from late 2015 through mid-2016, conducted by 72 different China-based groups whose identities range from "government and military actors, contractors, patriotic hackers, and even criminal elements."[1071] Of the 262 observed intrusions, 182 involved the networks of private and public U.S. entities.[1072] FireEye recorded that in April and May 2016, "three groups compromised the networks of four firms headquartered in the United States, Europe, and Asia that are involved in the manufacturing of semiconductors and chemical components used in the production of semiconductors."[1073]

One of the more notable exceptions to the observed decline comes from APT10, which is believed by several cybersecurity firms to be a Chinese cyber espionage group.[1074] In late 2016, BAE Systems and PricewaterhouseCoopers reported that they had been investigating a campaign of intrusions, referred to as "Operation Cloud Hopper" by APT10 against several major IT managed service providers, including some U.S. companies.[1075] According to BAE, APT10's targeting is consistent with "industries that align with China's 13th Five-year Plan which would provide valuable information to advance the domestic innovation goals held within China."[1076] FireEye believes that APT10's activities historically have been "in support of Chinese national security

[1067] U.S. v. Wu Yingzhou et al., at 7.
[1068] FIREEYE, REDLINE DRAWN: CHINA RECALCULATES ITS USE OF CYBER ESPIONAGE 12-14 (2016).
[1069] FireEye is now the parent company of Mandiant.
[1070] Robert Hackett, *China's Cyber Spying on the U.S. Has Drastically Changed*, FORTUNE, June 25, 2016, (interviewing Laura Galante of FireEye). *See also* FIREEYE, REDLINE DRAWN: CHINA RECALCULATES ITS USE OF CYBER ESPIONAGE 4 (2016). FireEye concludes that Chinese cyberintrusions and cybertheft were decreasing since mid-2014 due to a number of factors including "ongoing [Chinese] military reforms, widespread exposure of Chinese cyber operations, and actions taken by the U.S. government." *Id.* at 4; *see also* IP COMMISSION, UPDATE TO THE IP COMMISSION REPORT (2017) ("cyberattacks may have declined in volume since about 2014, although whether this is a result of a crackdown in China on responsible units in the People's Liberation Army (PLA) or other factors is not entirely clear."). Other commenters note the decrease in activity linking it to the September 2015 joint statement as well as ongoing Chinese PLA reorganization, see, for example, James Lewis, CSIS, *Submission*, *Section 301 Hearing* 5 (Sept. 2017); and Erin Ennis, U.S.-CHINA BUSINESS COUNCIL [*hereinafter* "USCBC"], *Testimony*, *Section 301 Hearing* (Oct. 10, 2017) (referring to FireEye's June 2016 report concluding "a notable decrease in reports by American companies of intrusions from suspected Chinese hackers.").
[1071] FIREEYE, REDLINE DRAWN: CHINA RECALCULATES ITS USE OF CYBER ESPIONAGE 15 (2016).
[1072] FIREEYE, REDLINE DRAWN: CHINA RECALCULATES ITS USE OF CYBER ESPIONAGE 12 (2016).
[1073] FIREEYE, REDLINE DRAWN: CHINA RECALCULATES ITS USE OF CYBER ESPIONAGE 13 (2016).
[1074] *See e.g.*, FireEye, APT10 (MenuPass Group): New Tools, Global Campaign Latest Manifestation of Longstanding Threat (Apr. 6, 2017); *See also* BAE Systems, *APT10 – Operation Cloud Hopper*, (2017).
[1075] PWC, BAE SYSTEMS, APT10 – OPERATION CLOUD HOPPER (2017), *available at* https://www.pwc.co.uk/cyber-security/pdf/cloud-hopper-report-final-v4.pdf.
[1076] PWC, BAE SYSTEMS, APT10 – OPERATION CLOUD HOPPER 15 (Apr. 2017).

goals, including acquiring valuable military and intelligence information as well as the theft of confidential business data to support Chinese corporations."[1077]

BAE notes that APT10's activities use a strategy that is difficult to trace.[1078] By targeting IT managed service providers, APT10 is seeking the ability "to move laterally onto the networks of potentially thousands of other victims" and "has been observed to exfiltrate stolen intellectual property" while evading a network's defenses.[1079] BAE concludes that APT10 has increased its sophistication and has "significant staffing and logistical resources, which have increased over the last three years, with a significant step-change in 2016."[1080]

Another cybersecurity firm, Fidelis Cybersecurity, concluded that APT10 installed malware on the website of the National Foreign Trade Council (NFTC), such that when U.S. member companies registered for NFTC's board meeting scheduled for March 2017, the malware would be executed on their computers.[1081] According to Fidelis Cybersecurity, this particular malware would allow APT10 to exploit vulnerabilities known to exist within the user's applications.[1082] NFTC board members that may have sought to register for the meeting include a large group of leading U.S. companies across a wide range of commercial sectors.[1083]

The data set since September 2015 is necessarily more limited than the extensive data collected over the last decade on Chinese cyber intrusions and cyber theft. Notwithstanding an apparent decline in the observed number of cyber incidents, the continued use of cyber intrusions by the Chinese government targeting U.S. companies remains a serious problem. State-sponsored cyber intrusions originating from China into U.S. commercial networks occur alongside China's institutional framework for promoting its industrial and technological development through a state-led model in which state-owned enterprises and national champions are the recipients of extensive state support. In sum, the evidence indicates that China continues its policy and practice, spanning more than a decade, of conducting and supporting cyber-enabled theft and intrusions into the commercial networks of U.S. companies. This conduct provides the Chinese

[1077] *APT10 (MenuPass Group): New Tools, Global Campaign Latest Manifestation of Longstanding Threat*, FIREEYE, Apr. 6, 2017, https://www.fireeye.com/blog/threat-research/2017/04/apt10_menupass_grou.html.
[1078] PWC, BAE SYSTEMS, APT10 – OPERATION CLOUD HOPPER (Apr. 2017).
[1079] PWC, BAE SYSTEMS, APT10 – OPERATION CLOUD HOPPER 8 (Apr. 2017).
[1080] PWC, BAE SYSTEMS, APT10 – OPERATION CLOUD HOPPER 5 (Apr. 2017). FireEye, in April of 2017 agreed that APT10 had expanded their operations. *See APT10 (MenuPass Group): New Tools, Global Campaign Latest Manifestation of Longstanding Threat*, FIREEYE, Apr. 6, 2017.
[1081] *Operation TradeSecret: Cyber Espionage at the Heart of Global Trade*, FIDELIS CYBERSECURITY (Apr. 6, 2017), https://www.fidelissecurity.com/TradeSecret.
[1082] *Operation TradeSecret: Cyber Espionage at the Heart of Global Trade*, FIDELIS CYBERSECURITY (Apr. 6, 2017).
[1083] According to NFTC's website, board members include: ABB Incorporated, Amazon, Amgen, Applied Materials, Baxter International, British American Tobacco, Caterpillar Incorporated, Chevron, Cisco Systems, Inc., The Coca-Cola Company, ConocoPhillips, Inc, Corning Incorporated, Deloitte & Touche, LLP, Dentons US LLP, DHL Express (USA) Inc., E.I. du Pont de Nemours & Company, eBay Inc., Ernst & Young LLP, ExxonMobil Corporation, FCA US LLC, FedEx Express, Fluor Corporation, Ford Motor Company, General Electric Company, Google Inc., Halliburton Company, Hanesbrands Inc., Hewlett Packard Enterprise Company, HP Inc, IBM Corporation, Johnson Controls, KPMG, LLP, Mars Incorporated, Mayer Brown LLP, McCormick & Company, Inc., Microsoft Corporation, Mondelēz International, Occidental Petroleum Corporation, Oracle Corporation, Pernod Ricard USA, Pfizer Inc., PMI Global Services Inc, PricewaterhouseCoopers LLP, Procter & Gamble Company, Qualcomm Incorporated, Siemens Corporation, TE Connectivity, Toyota Motor Sales, USA, Incorporated, United Technologies Corporation, UPS, Visa Inc, and Wal-mart Stores.

government with unauthorized access to intellectual property, trade secrets, or confidential business information, including, but not limited to, technical data, negotiating positions, and sensitive and proprietary internal business communications. Indeed, the U.S. Chamber of Commerce in its submission states that the "U.S. industry does not believe there has been a full cessation of cyber enabled IP theft, and we urge the Trump Administration to ensure the Chinese government upholds the agreement."[1084]

C. China's Acts, Policies, and Practices Regarding Cybertheft of Intellectual Property Are Unreasonable

As described above, the statute defines an "unreasonable" act, policy, or practice as one that "while not necessarily in violation of, or inconsistent with, the international legal rights of the United States is otherwise unfair and inequitable."[1085] The statute expressly provides that acts, policies, or practices that are unreasonable includes those that deny fair and equitable provision of "adequate and effective protection of intellectual property rights notwithstanding the fact that the foreign country may be in compliance with the specific obligations of the Agreement on Trade-Related Aspects of Intellectual Property Rights."[1086]

It is the longstanding policy of the United States, most recently reaffirmed in 2014 in Presidential Policy Directive 28 (PPD-28), that "[t]he collection of foreign private commercial information or trade secrets is authorized only to protect the national security of the United States or its partners and allies. It is not an authorized foreign intelligence or counterintelligence purpose to collect such information to afford a competitive advantage to U.S. companies or U.S. business sectors commercially."[1087]

In fact, China's activities stand in contrast to domestic and international standards adopted around the world. Many countries prohibit and even criminalize the unauthorized intrusions into computer networks in certain circumstances, including intrusions that result in misappropriation of trade secrets.[1088] Moreover, countries around the world have repeatedly condemned activities by government actors to misappropriate trade secrets for commercial purposes. For example, leaders of the 21-member Asia-Pacific Economic Cooperation (APEC), which includes China, in November 2016 "reaffirm[ed] that economies should not conduct or support information and communications technology (ICT)-enabled theft of intellectual property or other confidential business information, with the intent of providing

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[1084] U.S. CHAMBER OF COMMERCE, *Submission*, *Section 301 Hearing* 38 (Oct. 3, 2017).
[1085] 19 U.S.C. § 2411(d)(3)(A).
[1086] 19 U.S.C. § 2411(d)(3)(B)(i)(II).
[1087] *Presidential Policy Directive – 2014 Directive on Signals Intelligence Activities*, Daily Comp. Pres. Docs. Section 1(c) (Jan. 17th, 2014), https://obamawhitehouse.archives.gov/the-press-office/2014/01/17/presidential-policy-directive-signals-intelligence-activities.
[1088] *See e.g.*, In the UK, Computer Misuse Act, 1990, § 1(1)(a); in Ireland, Criminal Damage Act, 1991, § 5(1); in Sweden, Lag (1990:409) Protection of Business Secrets Act and Brottsbalken [BrB][Criminal Code] 4:9c (Swed); in Italy, C.p. 615.ter; in Germany, Strafgesetzbuch [STGB][Penal Code] S (202)(2) and (303)(b); in Japan, [Unauthorized Computer Access Act], Law No. 128 of 1999, art. 3(2).

competitive advantages to companies or commercial sectors."[1089] Similarly, in November 2015, at the Antalya Summit, the G20 Leaders' Communique stated: "In the ICT environment, just as elsewhere, states have a special responsibility to promote security, stability, and economic ties with other nations. In support of that objective, we affirm that no country should conduct or support ICT-enabled theft of intellectual property, including trade secrets or other confidential business information, with the intent of providing competitive advantages to companies or commercial sectors."[1090]

The fact that a wide group of countries, including China have condemned ICT-enabled theft of intellectual property by foreign governments reinforces the conclusion that government acts, policies, and practices involving cyber theft of trade secrets for a commercial purpose is unreasonable.

Claims that there is no meaningful distinction between the Chinese government's cyber activities and that of other countries, including the United States, are not valid. China's cyber intrusions are unique from those of Western market economies because the intrusions occur within the framework of China's extensive state-driven economic development model, which has no parallel in Western market economies. Not only does the United States not rely on extensive industrial policy tools to identify specific commercial sectors and commercial technologies for development, the United States does not have national champions and state-owned enterprises to implement such policies. In other words, U.S. companies "do not have the advantage of leveraging government intelligence data for commercial gain."[1091]

Moreover, China's troubling track record of using cyber intrusion and cyber theft to target U.S. companies in sectors prioritized by China's industrial policies is "hurting the case for free trade" because "[m]utually beneficial economic exchange occurs only when there is acceptance of the rule of law. If the legal protection of property rights is ignored, free exchange makes much less sense: One side just takes from the other."[1092]

[1089] *Fact Sheet: 24th Annual APEC Economic Leaders' Meeting*, White House Office of the Press Secretary (Nov. 20, 2016), *available at* https://obamawhitehouse.archives.gov/the-press-office/2016/11/20/fact-sheet-24th-annual-apec-economic-leaders-meeting. In addition, the APEC leaders adopted a series of best practices on trade secret protection and enforcement against misappropriation that recognizes that APEC economies should consider applying criminal liability for the willful theft of trade secrets that can arise through electronic intrusions for a commercial advantage. *See* https://ustr.gov/sites/default/files/11202016-US-Best-Practices-Trade-Secrets.pdf.

[1090] G20 LEADERS' COMMUNIQUE, ANTALYA SUMMIT ¶26 (Nov. 2015), *available at* http://g20.org.tr/g20-leaders-commenced-the-antalya-summit/. In September 2017, the G7 issued the following G7 ICT and Industry Ministers' Declaration, "reaffirm[ing] that no country should conduct or support ICT-enabled infringement or misappropriation of intellectual property, including trade secrets or other confidential business information, with the intent of providing competitive advantages to companies or commercial sectors." G7 ICT and Industry Ministers' Declaration Making the Next Production Revolution Inclusive, Open and Secure (Sept. 26 2017).

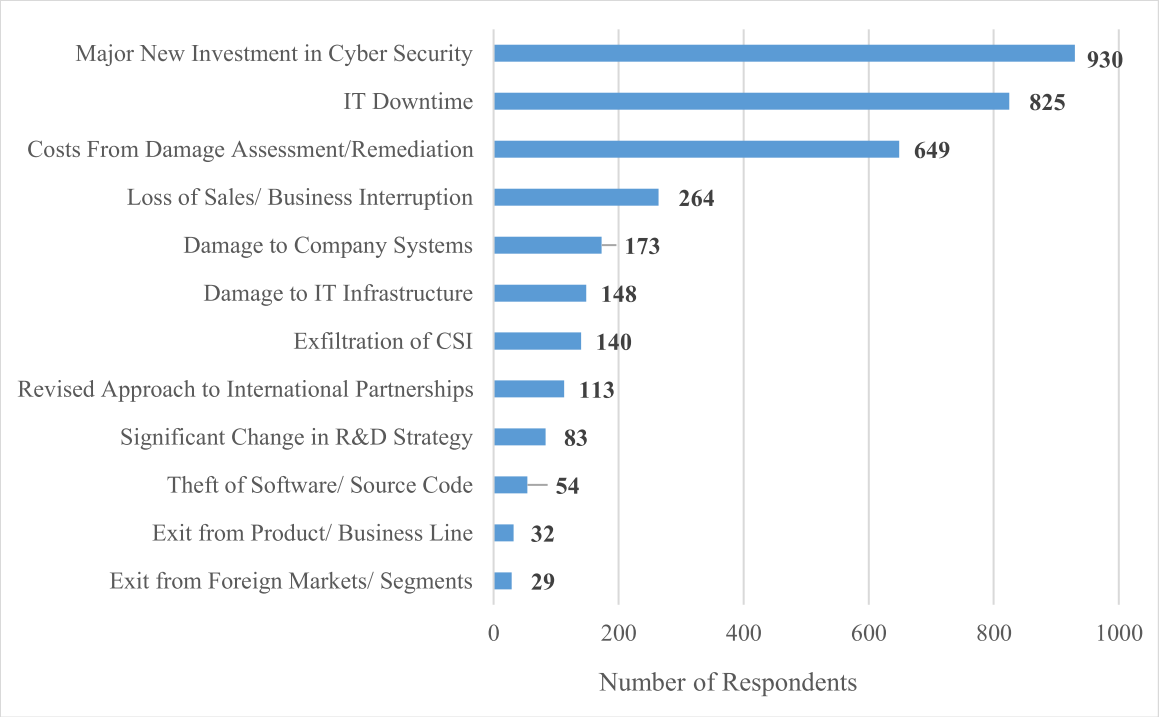
[1091] *Cyber Espionage and the Theft of U.S. Intellectual Property and Technology: Hearing Before the House of Representatives Committee on Energy and Commerce Subcommittee on Oversight and Investigations* (July 9, 2013) (statement of Larry M. Wortzel).

[1092] Derek Scissors, *Chinese Economic Espionage Is Hurting the Case for Free Trade*, HERITAGE (Nov. 19, 2012), http://www.heritage.org/trade/report/chinese-economic-espionage-hurting-the-case-free-trade.

Based on the foregoing factors, China's acts, policies, and practices of cyber intrusions into the computer networks of U.S. business and the theft of firms' sensitive commercial information are unreasonable.

D. China's Acts, Policies, and Practices Regarding Cybertheft of Intellectual Property Burden U.S. Commerce

China's cyber intrusion and cyber theft activities harm U.S. business interests in a variety of ways. It can be difficult to assess the full burden on U.S. commerce because of chronic under reporting, companies being unaware that their network have been compromised or being unaware of the extent of the damage done. Nevertheless, a recent survey conducted by the Bureau of Industry and Security (BIS) contains the responses of more than 8,000 companies in the United States about the impact they face from malicious cyber activity from all sources. Respondents noted the following impacts in descending order:



Source: U.S. Department of Commerce, Bureau of Industry and Security, Ongoing Defense Industrial Base Assessment.

First and foremost, cyber intrusions and cyber theft damage company performance and competitiveness, and result in lost sales, lost revenue, disruption of supply chains, lost business opportunities, and failure to achieve return on investment. For example, SolarWorld in its submission to USTR in connection with this investigation stated that the Chinese government's cyber-theft of its proprietary business information "resulted in more than $120 million in damages in the form of lost sales and revenue" because Chinese producers entered the market

earlier than expected based on the proprietary information taken.[1093] SolarWorld's statement also provided the following:

> The injury to SolarWorld and other solar manufacturers is particularly acute, given the [Chinese] government subsidized Chinese producers of solar cells and panels, who appear to have benefited from the stolen trade secrets, have been flooding the U.S. marked with dumped products, since 2012, driving nearly 30 U.S. companies out of business, and leaving the U.S. solar manufacturing industry on the brink of collapse.[1094]

At the hearing, Solar World America's CEO, Jürgen Stein, testified:

> [SolarWorld's] efforts to stay ahead of the Chinese wave of illegally dumped and subsidized lower power and quality imports were thwarted by the hacking and theft of proprietary information about the [passivated emitter rear contact (PERC)] process that we had innovated. Between May and September 2012, exactly the time we brought this technology to mass production, SolarWorld's IT system was hacked 13 times by Chinese military hackers. Now, armed with our proprietary data and armed with our cost data, we saw our Chinese competitors leap overnight into PERC technology that we had innovated and with economic information that would unfairly enhance their positions in price negotiations.
>
> By early 2014, a prominent Chinese-based solar rival, JA Solar, announced it was converting to PERC technology, and it began mass production of PERC in May of that year.[1095] By early 2015, Chinese-based Trina announced its own PERC conversion and came to the market later that year with a comparable PERC technology.
> While the five Chinese military hackers have never been brought to justice in this country, we firmly believe that were it not for their economic espionage and theft from SolarWorld Americas, Chinese solar producers like JA Solar and Trina would have taken far longer to make the leap into PERC technology. State-sponsored hacking and theft by China greatly weakened SolarWorld's first-mover status and again left SolarWorld vulnerable to China's relentless effort to take over the U.S. solar industry through the sale of solar cells and panels below the cost of production.[1096]

In a post-hearing submission to USTR, SolarWorld stated:

> Perhaps the greatest loss that SolarWorld has sustained, and continues to sustain, as a result of the Chinese government's cyberhacking is the unfair loss of its competitive advantage, thereby resulting in significant losses in market leadership, sales, and profitability.... SolarWorld has invested in significant R&D and in the application of new

[1093] SOLARWORLD, *Submission*, *Section 301 Hearing* 3-6 (Oct. 20, 2017) ("SolarWorld strongly believes that this [early entry of Chinese solar competitors] was the result of information stolen from SolarWorld's systems and provided to SolarWorld's Chinese competitors.").
[1094] SOLARWORLD. *Submission*, *Section 301 Hearing* 5-6 (Sept. 28, 2017).
[1095] In its post-hearing submission, SolarWorld provided a correction that JA Solar announced it had launched its PERC product in October 2013. SOLARWORLD, *Submission*, *Section 301 Hearing* 5 (Oct. 20, 2017).
[1096] Juergen Stein, SOLARWORLD, *Testimony*, *Section 301 Hearing* 76 (Oct. 10, 2017).

> technologies in its manufacturing process, all with the goal of moving solar technology forward and successfully competing with the unfairly-priced solar cell and module imports from manufacturers in Asia. These efforts, however, were lost almost overnight when Chinese state-backed actors infiltrated SolarWorld's systems and stole its proprietary information. This loss has been devastating to SolarWorld. As explained in [SolarWorld CEO's] testimony, SolarWorld worked for eight years on the development of the state-of-the-art Passivated Emitter Rear Contact (PERC) technology.' After years of R&D, SolarWorld became the first manufacturer to industrialize PERC cell production, an advantage, based on the price premium for the state-of-the-art technology and high-quality materials used to produce quality product, that we expected to remain for several years. Instead, SolarWorld's significant investments in this technology - estimated at approximately $60 million in R&D and $600 million total in setting up all production sites, equipment and processes – have been undercut by Chinese competitors.[1097]

As the SolarWorld example illustrates, Chinese cyber theft of commercially sensitive information often takes place in industries that the Chinese government has prioritized for state-support, and the victims often operate in U.S. industries that are already suffering from the result of China's other policy tools.

Moreover, U.S. companies often lack effective recourse under U.S. or Chinese law after they have been a victim of a Chinese cyber intrusion or cyber theft to recover the damages they incurred from such activity. As described above, the practical and financial challenges of litigation prevented U.S. Steel from being able to seek legal relief against its well-funded Chinese SOE adversary in litigation.[1098]

In addition, there are significant remediation costs a company must incur after a cyber intrusion. Even if the hackers are ultimately unable to monetize all the information they have stolen, the victim must expend significant resources to deal with the potential implications. Cyber intrusions and cybertheft can lead to service disruptions that interrupt a firm's sales or other operations.[1099] According to one study, it takes on average 191 days to identify that a data breach has occurred, and 66 days to contain it.[1100] Containing a data breach requires "forensic and investigative activities, assessment and audit services, crisis team management and communications to executive management and board of directors."[1101]

[1097] SOLARWORLD, *Submission*, *Section 301 Hearing* 2-4 (Oct. 20, 2017).
[1098] U.S. STEEL, *Submission*, *Section 301 Hearing* 2 (Sept. 28, 2017).
[1099] MCAFEE, CSIS, THE ECONOMIC IMPACT OF CYBERCRIME AND CYBER ESPIONAGE 10 (July 2013).
[1100] PONEMON INSTITUTE, 2017 COST OF DATA BREACH STUDY 3 (June 2017).
[1101] PONEMON INSTITUTE, 2017 COST OF DATA BREACH STUDY 3 (June 2017). The report details these activities further: "Conducting investigations and forensics to determine the root cause of the data breach; Determining the probable victims of the data breach; Organizing the incident response team; Conducting communication and public relations outreach; Preparing notice documents and other required disclosures to data breach victims and regulators; Implementing call center procedures and specialized training." *Id*. at 29.

Even after a data breach is contained, companies bear significant additional burdens including "legal expenditures . . . identity protection services and regulatory interventions."[1102] Reputational damage is also a burden that companies in many instances bear after experiencing cyber intrusion or cyber theft. After such breaches, experts observe that a company's valuation may decrease from a drop in stock prices after the company publicly reports that it has been hacked.[1103]

At the macro-level, one study concluded that cyber intrusions and cyber theft have a significant impact on U.S. employment. A report by the Center for Strategic and International Studies (CSIS) and McAfee, found that cybercrime from all sources costs approximately 200,000 jobs annually in the United States.[1104] According to CSIS, "Cybercrime is a tax on innovation and slows the pace of global innovation by reducing the rate of return to innovators and investors…For developed countries; cybercrime has serious implications for employment. The effect of cybercrime is to shift employment away from jobs that create the most value. Even small changes in GDP can affect employment."[1105]

For all of the foregoing reasons, China's cyber activities targeting U.S. companies poses significant costs on U.S. companies and burdens U.S. commerce.

[1102] PONEMON INSTITUTE, 2017 COST OF DATA BREACH STUDY 3 (June 2017).
[1103] MCAFEE, CSIS, THE ECONOMIC IMPACT OF CYBERCRIME AND CYBER ESPIONAGE at 12-13. The report notes that valuation drops typically do not appear to be permanent; however, financial transactions and lost expectations occurring during the window of any valuation drop would reasonably have an impact on the firm.
[1104] Press Release, McAfee and CSIS: Stopping Cybercrime Can Positively Impact World Economies (June 9, 2014), https://www.mcafee.com/us/about/news/2014/q2/20140609-01.aspx.
[1105] Press Release, McAfee and CSIS: Stopping Cybercrime Can Positively Impact World Economies (June 9, 2014), https://www.mcafee.com/us/about/news/2014/q2/20140609-01.aspx.

VI. Other Acts, Policies, and Practices of China

A. Introduction

The *Federal Register Notice* also invited comments from interested parties on other acts, policies and practices of China relating to technology transfer, intellectual property (IP), and innovation that might be included in this investigation, and/or might be addressed through other applicable mechanisms.[1106] The following issues were cited by interested parties as acts, policies, and practices of China that may warrant investigation. While the following actions may well meet the Section 301 standards of unreasonable or discriminatory acts, policies, and practices that burden or restrict U.S. commerce, this investigation does not make that determination. These matters warrant further investigation. Going forward, USTR will identify the best tools to address them including, but not limited to, more intensive bilateral engagement, WTO dispute settlement, and/or additional Section 301 investigations.

1. Measures Purportedly Related to National Security or Cybersecurity

Stakeholders report that China increasingly is incorporating into its commercial regulations protections allegedly needed for "national security" or "cybersecurity" purposes.[1107] Many of China's regulations are new or in draft form and their effect on U.S. companies is still coming into view. Companies have raised particular concerns about the *Cybersecurity Law of the People's Republic of China* (*Cybersecurity Law*). The *Cybersecurity Law*, which came into effect in June 2017, generally establishes security reviews for a broad range of IT products and services[1108]; imposes restrictions on the cross-border flow of data; requires data localization for certain parties and types of data; and authorizes the development of national cybersecurity standards that exceed the burden and scope of international standards.[1109]

The *Cybersecurity Law's* provision requiring the implementation of a cybersecurity-specific multilevel protection scheme for information and communications technology (ICT) products used in network security appears to reinforce China's *Regulations on Classified Protection of Information Security*, also known as the Multi-Level Protection Scheme (MLPS), about which

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[1106] *See* Appendix A.

[1107] These cyber-security measures/protections include: *Administrative Measures for New Internet Services Security Assessments (Draft)*, *Baseline for Cybersecurity Classified Protection: Special Security Requirements for Mobile Interconnection (Draft)*, *Catalogue of Network (Cyber) Critical Equipment and Cybersecurity Specific Products*, *Controllability Evaluation Index for Security of Information Technology Products, Part 1: General Principles (Draft)*, *Controllability Evaluation Index for Security of Information Technology Products, Part 2: Central Processing Unit (Draft)*, *Controllability Evaluation Index for Security of Information Technology Products, Part 5: General Purpose Computer (Draft)*, *Cryptography Law of the People's Republic of China (Draft)*, *Cybersecurity Law*, *National Security Law of the People's Republic of China*, *Key Network and Specialized Equipment Security Products Catalogue*, *Regulations on Classified Protection of Information Security* (MLPS), and *Information Security Technology – Security Controllable Level Evaluation Index of Information Technology Products: Part 2: Central Processing Unit (Draft*).

[1108] For a discussion of security review processes and requirements for disclosure of sensitive information, *see* Section II.C. of this report.

[1109] *See, e.g.*, NAT'L FOREIGN TRADE COUNCIL [*hereinafter* "NFTC"], *Submission*, *Section 301 Hearing* 4 (Sept. 28, 2017) (explaining that particularly with respect to cloud service providers, China is the only country addressing national security concerns by pressuring the transfer of technology).

the United States has expressed concern since adoption in 2007.[1110] In general, the MLPS is a system that classifies ICT products and components according to their level of national security. It is reportedly aimed at promoting indigenous innovation by mandating that products used in Chinese information networks at a certain level of national security importance be developed and produced by entities owned or controlled by the government.[1111]

With regard to data localization, a number of interested parties discussed Chinese policies that require certain "critical information infrastructure providers" to store their data on servers in China.[1112] As the U.S. Chamber of Commerce explained, if a foreign company is forced to localize a valuable set of data or information in China, whether for R&D purposes or simply to conduct their business, it will have to assume a significant amount of risk that its data or information may be misappropriated or misused, especially given the environment in China, where companies face significant legal and other uncertainties when they try to protect their data and information.[1113] As noted further, "Chinese laws, such as the National Security, Cybersecurity, and recently passed National Intelligence Laws, give authorities expansive latitude to gain access to companies' physical facilities and digital information."[1114]

Fears about data misappropriation are also raised by Article 37 of the *Cybersecurity Law*, which prohibits critical information infrastructure operators from exporting "personal information" or "important data" unless they have first gone through a security assessment. While some other jurisdictions require companies to ensure an adequate level of protection for personal information transferred abroad, typically these rules are strictly limited to personal information. An extension to "important data" would therefore appear to sweep in much of the business data that is otherwise routinely and freely transferred cross-border by multinationals operating in other jurisdictions.[1115] Moreover, as the general scope of these security assessments is still being defined, it remains worth monitoring whether China will ultimately impose stricter requirements for "personal information" exports than what is now found in international practice.

Stakeholders also raised concerns with China's encryption regulations and the China Compulsory Certification (CCC) testing regime for information security products. While these measures have been in force since 2009, until 2017 they were limited to companies seeking to sell to China's government. However, in June 2017, the Cybersecurity Administration of China

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[1110] INFORMATION TECHNOLOGY & INNOVATION FOUNDATION [*hereinafter* "ITIF"], *Submission*, *Section 301 Hearing* (Sept. 28, 2017).
[1111] U.S. CHAMBER OF COMMERCE [*hereinafter* "U.S. Chamber"], *Submission*, *Section 301 Hearing* 32 (Oct. 3, 2017); SEMICONDUCTOR INDUSTRY ASS'N [*hereinafter* "SIA"], *Submission*, *Section 301 Hearing* 11-2 (Oct. 5, 2017).
[1112] The definition given for "critical information infrastructure operators" in the *Cybersecurity Law* (adopted by the Twentieth Session of the Twelfth NPC on Nov. 7, 2016, effective June 1, 2017) is vague and it is unclear how broadly it will be interpreted. *See Cybersecurity Law*, art. 31 ("The national government, on the basis of a network security level protection system, will prioritize protection of important industries and fields including public communications and information services, energy, transport, water utilities, finance, public services, and e-government affairs, as well as other critical information infrastructure that may result in serious damage to national security, people's livelihoods, and the public interest as soon as it is destroyed, loses its functionality or experiences a data breach.").
[1113] *See*, *e.g.*, U.S. CHAMBER, *Submission*, *Section 301 Hearing* 33-4 (Oct. 3, 2017).
[1114] *See*, *e.g.*, U.S. CHAMBER, *Submission*, *Section 301 Hearing* 10, 34 (Oct. 3, 2017).
[1115] U.S. CHAMBER, *Submission*, *Section 301 Hearing* 10, 34 (Oct. 3, 2017).

released the *Catalogue of Critical Network Equipment and Network Security Products (First Batch)*,[1116] which expanded the restrictions beyond government procurement to 15 categories of commercial products, including routers, anti-spam software, servers, and other technology products.[1117] These and other final and draft regulations raise substantial concerns for U.S. stakeholders.

2. Inadequate Intellectual Property Protection

Inadequate protection of IP has been a top concern for American companies doing business in China for many years.[1118] Stakeholders identified numerous IP protection problems including trade secret theft[1119] and bad faith trademarking.[1120] With regard to patents, stakeholders also asserted that Chinese government-owned entities were responsible for substantial infringement.[1121] Stakeholders were further concerned about widespread counterfeiting in China and the distribution of counterfeit products over the Internet.[1122] Counterfeiting occurs in a wide

[1116] *Four Department Notice on Announcing the Catalogue of Critical Network Equipment and Network Security Products (First Batch)* (National Internet Information Office, MIIT, Public Security Bureau, Certification and Accreditation Administration, issued June 1, 2017).
[1117] TELECOMMUNICATIONS INDUSTRY ASS'N [*hereinafter* "TIA"], *Submission*, *Section 301 Hearing* 3 (Sept. 28, 2017).
[1118] *See e.g.*, AM. BAR ASS'N [*hereinafter* "ABA IPL"], *Submission*, Section *301 Hearing* 2 (Sept. 27, 2017); ABRO INDUSTRIES [*hereinafter* "ABRO"], *Submission*, *Section 301 Hearing* 1 (Sept. 28, 2017); AM. APPAREL & FOOTWEAR ASS'N [*hereinafter* "AAFA"], *Submission*, *Section 301 Hearing* 2, 4 (Sept. 28, 2017); AM. BRIDAL & PROM INDUSTRY ASS'N [*hereinafter* "ABPIA"], *Submission*, *Section 301 Hearing* 2-3 (Sept. 28, 2017); AM CHAMBER OF COMMERCE SHANGHAI [*hereinafter* "Am. Cham. Shanghai"], *Submission*, *Section 301 Hearing* 1 (Sept. 28, 2017); AM. CHEMISTRY COUNCIL [*hereinafter* "ACC"], *Submission*, *Section 301 Hearing* 3 (Sept. 27, 2017); AM. SUPERCONDUCTOR CORP. [*hereinafter* "AMSC"], *Submission*, *Section 301 Hearing* 2-3 (Sept. 28, 2017); BIOTECHNOLOGY INNOVATION ORG. [*hereinafter* "BIO"], *Submission*, *Section 301 Hearing* 1-2 (Sept. 28, 2017); BONUMOSE BIOCHEM [*hereinafter* "Bonumose"], *Submission*, *Section 301 Hearing* 3-4 (Sept. 27, 2017); LEE BRANSTETTER, *Submission, Section 301 Hearing* 4 (Sept. 28, 2017); Stephen Zirschky, *Submission*, *Section 301 Hearing* 2 (Sept. 28, 2017); BSA THE SOFTWARE ALLIANCE [*hereinafter* "BSA"], *Submission*, *Section 301 Hearing* 2 (Sept. 28, 2017); JACK CHANG, *Submission, Section 301 Hearing* 4 (Sept. 28, 2017); COMPTIA, *Submission*, *Section 301 Hearing* 2 (Sept. 28, 2017); CONGRESSMAN PASCRELL, *Submission, Section 301 Hearing* 4 (Sept. 28, 2017); CONSUMER TECHNOLOGY ASS'N [*hereinafter* "CTA"], *Submission*, *Section 301 Hearing* 2 (Sept. 28, 2017); James Lewis, CENTER FOR STRATEGIC & INT'L. STUDIES [*hereinafter* "CSIS"], *Submission*, *Section 301 Hearing* 6 (Sept. 27, 2017); DAIS ANALYTIC CORP. [*hereinafter* "Dais"], *Submission*, *Section 301 Hearing* 2 (Sept. 27, 2017); COMM'N ON THE THEFT OF INTELLECTUAL PROPERTY [*hereinafter* "IP Commission"], *Submission*, *Section 301 Hearing* 3 (Sept. 28, 2017); MOTOR & EQUIPMENT MANUFACTURERS ASS'N [*hereinafter* "MEMA"], *Submission*, *Section 301 Hearing* 2 (Sept. 28, 2017); MICHELMAN, *Submission*, *Section 301 Hearing* 2 (Oct. 6, 2017); NAT'L. ASS'N OF MANUFACTURERS [*hereinafter* "NAM"], *Submission*, *Section 301 Hearing* 2 (Sept. 28, 2017); NFTC, *Submission*, *Section 301 Hearing* 2 (Sept. 28, 2017); PHRMA, *Submission*, *Section 301 Hearing* 2 (Sept. 22, 2017); SIA, *Submission*, *Section 301 Hearing* 1 (Oct. 5, 2017); STEWART & STEWART, *Submission*, *Section 301 Hearing* 2 (Sept. 28, 2017); U.S. CHAMBER, *Submission*, *Section 301 Hearing* 5 (Oct. 3, 2017); U.S. CHINA BUSINESS COUNCIL [*hereinafter* "USCBC"], *Submission*, *Section 301 Hearing* 2 (Sept. 28, 2017); U.S. COUNCIL FOR INT'L BUSINESS [*hereinafter* "USCIB"], *Submission*, *Section 301 Hearing* 1-2 (Sept. 28, 2017); WILEY REIN, *Submission*, *Section 301 Hearing* 12, 14 (Sept. 28, 2017).
[1119] SIA, *Submission*, *Section 301 Hearing* 15-16 (Oct. 5, 2017); ABA IPL, *Submission*, Section *301 Hearing* 3-4 (Sept. 27, 2017).
[1120] CTA, *Submission*, *Section 301 Hearing* 3-4 (Sept. 28, 2017).
[1121] CATHERINE LIN-HENDEL, *Submission*, *Section 301 Hearing* (Aug. 28, 2017); SKADDEN, ARPS. SLATE, MEAGHER & FLOM LLP [*hereinafter* "Skadden"], *Submission*, *Section 301 Hearing* 20 (Sept. 28, 2017).
[1122] AAFA, *Submission*, *Section 301 Hearing* 2, 4 (Sept. 28, 2017); ABPIA, *Submission*, *Section 301 Hearing* 1-2 (Sept. 28, 2017).

range of product categories, including medicines, consumer electronics, toys, computer accessories, clothing and footwear, formalwear, automobile parts, and semiconductors.[1123]

Stakeholders also raised concerns over inadequate IP enforcement mechanisms available in China. Although some stakeholders submit that the legal framework has improved, many reported substantial obstacles to civil enforcement and ineffective and inconsistent criminal and administrative enforcement by the government of China.[1124] Stakeholders further stated that enforcement problems are exacerbated by insufficient governmental coordination, insufficient political will by Chinese officials, and inadequate resources and capacity to address IP problems.[1125]

3. China's Anti-Monopoly Law

A number of submissions asserted that China uses the *Anti-Monopoly Law of the People's Republic of China* (AML) as a means to obtain U.S. IP, citing as examples the AML agencies' multiple draft guidelines. Other submissions raised general concern regarding use of the AML for industrial policy purposes, and several complained about poor procedural protections in enforcement of the AML and about certain enforcement actions allegedly addressing abuse of dominance in the exercise of IP rights.

In regard to the concerns raised on IP guidelines, submissions cited the State Administration of Industry Commerce (SAIC) *2015 Rules on the Prohibition of Conduct Eliminating or Restricting Competition by Abusing Intellectual Property Rights* (SAIC Rules) and the March 2017 draft *State Council Anti-Monopoly Commission Guidelines Against Abuse of Intellectual Property Rights* (Guidelines).[1126] For example, there were concerns with Article 7 of the SAIC Rules, which recognizes IP as an "essential facility," with one submission noting that this provision could allow SAIC to treat any unilateral refusal to license as an "abuse of IPR."[1127]

In regard to enforcement, several submissions asserted that Chinese AML authorities use the AML as a tool to advance industrial policy rather than to protect competition.[1128] While some submissions noted improvements in AML enforcement, they also noted continued concerns with

[1123] *See*, *e.g.*, COMPTIA, *Submission*, *Section 301 Hearing* 7 (Sept. 28, 2017); CHINA CHAMBER OF INTERNATIONAL COMMERCE [hereinafter "CCOIC"], *Submission*, *Section 301 Hearing* 24-9 (Sept. 26, 2017); ABPIA, *Submission*, *Section 301 Hearing* 1 (Sept. 28, 2017); U.S. CHAMBER, *Submission*, *Section 301 Hearing* 36 (Oct. 3, 2017).
[1124] ABA IPL, *Submission*, *Section 301 Hearing* 2, 4 (Sept. 27, 2017); CTA, *Submission*, *Section 301 Hearing* 4 (Sept. 28, 2017); MEMA, *Submission*, *Section 301 Hearing* 3-4 (Sept. 28, 2017); NAM, *Submission*, *Section 301 Hearing* 13-4 (Sept. 28, 2017); USCBC, *Submission*, *Section 301 Hearing* 2 (Sept. 28, 2017).
[1125] MEMA *Submission*, *Section 301 Hearing* 3-4 (Sept. 28, 2017); NAM, *Submission*, *Section 301 Hearing* 13-4 (Sept. 28, 2017).
[1126] *See, e.g.*, Stephen Ezell, ITIF, *Testimony, Section 301 Hearing* 21 (Oct. 10, 2017); NAM, *Submission*, *Section 301 Hearing* 9, 13 (Sept. 28, 2017).
[1127] SIA, *Submission*, *Section 301 Hearing* 13 (Oct. 5, 2017).
[1128] *See*, *e.g.*, USCIB, STATEMENT ON CHINA'S COMPLIANCE WITH ITS WTO COMMITMENTS 15 (Sept. 20, 2017); USCIB, *Submission*, *Section 301 Hearing* 1-2 (Sept. 28, 2017).

transparency and due process,[1129] and alleged discriminatory enforcement against certain foreign companies.[1130]

4. China's Standardization Law

According to stakeholder submissions, China's recently enacted *Amendments to the Standardization Law of the People's Republic of China* (*Standardization Law Amendments*) raise concerns related to whether U.S. companies will be required to transfer valuable IP or license it on non-market terms as a condition of participation in standards setting bodies.[1131] Stakeholders assert that the amendments impose unique and potentially damaging requirements on enterprises to publicly disclose functional indicators and performance indicators of their products or services, which may result in unnecessary costs and risks.[1132] Furthermore, the Amendments reportedly endorse a preference for indigenous innovation in Chinese standards, to the detriment of U.S. and other non-Chinese companies.[1133]

5. Talent Acquisition

Certain participants in the investigation emphasized the challenges posed by China's acquisition of U.S. engineers and other professional employees in technology-related companies. For instance, the Semiconductor Industry Association (SIA) has observed a "notable shift from M&A to a more sophisticated process of acquiring hundreds of talented engineers and managers from foreign companies."[1134] As SIA explains:

> It has been reported that Chinese state-owned firms have been highly successful in recruiting this high-tech engineering talent, which is enabled by massive Chinese government subsidies that allow for salaries to be offered at high, non-market rates. Often high-level managers are lured away from target companies with compensation packages four or five times the market rates. These managers then target key former employees in technology development, manufacturing and facilities, promising outsized compensation.[1135]

The Chinese government has issued a number of medium- and long-term plans for talent development,[1136] while pursuing initiatives that actively encourage the recruitment of foreign

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[1129] AM. CHAMBER OF COMMERCE CHINA, 2017 AMCHAM CHINA WHITE PAPER 38 (2017).
[1130] *See*, *e.g.*, USCIB, *Submission*, *Section 301 Hearing* 2 (Sept. 28, 2017); WILEY REIN, *Submission*, *Section 301 Hearing* 6-8 (Sept. 28, 2017); IP COMM'N, *Submission*, *Section 301 Hearing* 8 (Sept. 28, 2017).
[1131] U.S. CHAMBER, *Submission*, *Section 301 Hearing* 26 (Oct. 3, 2017); WILEYREIN, *Submission*, *Section 301 Hearing* 6-7 (Sept. 28, 2017).
[1132] U.S. CHAMBER, *Submission*, *Section 301 Hearing* 26 (Oct. 3, 2017).
[1133] *PRC Standardization Law Amendments*, art. 20 (promulgated by the Fifth Session of the Twelfth NPC on Dec. 29, 1988, amended by the Thirtieth Session of the Twelfth NPC on Nov. 4, 2017).
[1134] SIA, *Submission*, *Section 301 Hearing* 15 (Oct. 5, 2017).
[1135] SIA, *Submission*, *Section 301 Hearing* 15-6 (Oct. 5, 2017).
[1136] For instance, to improve the quality of high-skilled labor in the economy, the CCP Central Committee and the State Council issued the *Outline of the National Medium- and Long-Term Talent Development Plan* in 2010. *See Outline of the National Medium- and Long-Term Talent Development Plan* (CCP Central Committee and State Council, Zhong Fa [2010] No. 6, issued Apr. 1, 2010); Wang Huiyao, CHINA'S NATIONAL TALENT PLAN: KEY MEASURES AND OBJECTIVES, BROOKINGS INSTITUTE, 23 (Nov. 2010).

talent and Chinese persons overseas to boost national competitiveness. These plans establish specific targets for attracting "talented" individuals and cut across technical specializations, finance, and high-technology domains.[1137]

China's talent acquisition activities are global in their scope and scale, but reportedly have been particularly concentrated in top U.S. universities and Silicon Valley. With support from various government programs and entities, notably the China Association of Science and Technology, Chinese enterprises reportedly have begun establishing "talent bases" in China and the United States to support cutting-edge R&D and the active recruitment of top talent. For instance, Chinese government plans prioritize the pursuit of human capital in artificial intelligence (AI).[1138] And, as the SIA submission indicates, Chinese companies have reportedly lured top talent from foreign companies by paying well above market compensation—enabled by government financing, direction, and support.[1139] These activities may provide a key conduit for technology transfer from the United States to China.

B. Conclusion

USTR acknowledges the importance of these issues and agrees with stakeholders that the matters warrant further investigation. A number of concerns of this nature have previously been raised in USTR's annual proceedings under Special 301 and the annual review of China's WTO accession compliance. A range of tools may be appropriate to address these serious matters including more intensive bilateral engagement, WTO dispute settlement, and/or additional Section 301 investigations.

[1137] *See, e.g., Notice on Issuing the "Medium- and Long-Term Financial Sector Talent Development Plan"* (People's Bank of China, China Banking Regulatory Commission, China Securities Regulatory Commission, China Insurance Regulatory Commission, Yin Fa [2011] No. 18, promulgated Jan. 24, 2011); *Notice on Launching Stage-Wise Evaluation Work for the "Medium- and Long-Term Plan to Establish Technical Specialization Talent Teams (2010-2020)* (Ministry of Human Resources and Social Security, promulgated on May 27, 2013); *Medium- and Long-Term Plan to Establish High-Skilled Talent Teams* (Ministry of Human Resources and Social Security, promulgated in 2011).

[1138] *State Council Notice on the Issuance of the New Generation Artificial Intelligence Development Plan* (State Council, Guo Fa [2017] No. 35, promulgated on July 8, 2017), *available at* http://www.gov.cn/zhengce/content/2017-07/20/content_5211996.htm; s*ee also An Overview of Overseas Offshore Talent Innovation Base,* CAST*,* http://www.cast.org.cn/n200675/n202200/n202372/c400650/content.html.

[1139] SIA, *Submission*, *Section 301 Hearing* 15-6 (Oct. 5, 2017); Huang Yijun, Chen Liangrong, He Yunting, *Interview with Ziguang Group Chairman Zhao Weiguo*, TIANXIA NEWS, Nov. 1, 2015; *Taiwan Semiconductor Leader Jumps to the Mainland*, INITIUM MEDIA, Oct. 7, 2015; David Manners, *Micron Sues Ex-Employees Working for China DRAM Companies*, ELECTRONICS WEEKLY, Apr. 7, 2017.

APPENDIX A

ADDRESSES: Submit completed loan applications to: U.S. Small Business Administration, Processing And Disbursement Center, 14925 Kingsport Road, Fort Worth, TX 76155.

FOR FURTHER INFORMATION CONTACT: A. Escobar, Office of Disaster Assistance, U.S. Small Business Administration, 409 3rd Street SW., Suite 6050, Washington, DC 20416, (202) 205–6734.

SUPPLEMENTARY INFORMATION: The notice of an Administrative declaration for the State of CALIFORNIA, dated 07/31/2017, is hereby amended to establish the incident closing date as 08/01/2017.

Incident: Detwiler Fire.

Incident Period: 07/16/2017 through 08/01/2017.

All other information in the original declaration remains unchanged.

(Catalog of Federal Domestic Assistance Number 59008)

Linda E. McMahon,

Administrator.

[FR Doc. 2017–17915 Filed 8–23–17; 8:45 am]

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OFFICE OF THE UNITED STATES TRADE REPRESENTATIVE

[Docket No. USTR–2017–0016]

Initiation of Section 301 Investigation; Hearing; and Request for Public Comments: China's Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation

AGENCY: Office of the United States Trade Representative.

ACTION: Notice of initiation of investigation; hearing; and request for comments.

SUMMARY: The United States Trade Representative has initiated an investigation pursuant to the Trade Act of 1974, as amended (the Trade Act), to determine whether acts, policies, and practices of the Government of China related to technology transfer, intellectual property, and innovation are actionable under the Trade Act. The inter-agency Section 301 Committee is holding a public hearing and seeking comments in connection with this investigation.

DATES: The United States Trade Representative initiated the investigation on August 18, 2017. The schedule and due dates are as follows:

To be assured of consideration, written comments and requests to appear at the hearing must be submitted by Thursday, September 28, 2017 at 11:59 p.m. The request to appear must include a summary of testimony.

Tuesday, October 10, 2017: The Section 301 Committee will convene a public hearing in the main hearing room of the U.S. International Trade Commission, 500 E Street SW., Washington, DC 20436, beginning at 9:30 a.m. If necessary, the hearing may continue on the next business day.

To be assured of consideration, post-hearing rebuttal comments must be submitted by Friday, October 20, 2017 at 11:59 p.m.

ADDRESSES: You should submit written comments through the Federal eRulemaking Portal: *http://www.regulations.gov.* Follow the instructions for submitting comments in section II below. For alternatives to on-line submissions, please contact Gwendolyn Diggs at (202) 395–3150 before transmitting a comment and in advance of the relevant deadline.

FOR FURTHER INFORMATION CONTACT: For procedural questions concerning written comments or participating in the public hearing, contact Gwendolyn Diggs at (202) 395–3150. Direct all other questions regarding this notice to William Busis, Deputy Assistant U.S. Trade Representative for Monitoring and Enforcement and Chair of the Section 301 Committee, or Katherine Linton and Arthur Tsao, Assistant General Counsels at (202) 395–3150.

SUPPLEMENTARY INFORMATION

A. The President's Memorandum

On August 14, 2017, the President issued a Memorandum (82 FR 39007) to the United States Trade Representative stating *inter alia:*

> China has implemented laws, policies, and practices and has taken actions related to intellectual property, innovation, and technology that may encourage or require the transfer of American technology and intellectual property to enterprises in China or that may otherwise negatively affect American economic interests. These laws, policies, practices, and actions may inhibit United States exports, deprive United States citizens of fair remuneration for their innovations, divert American jobs to workers in China, contribute to our trade deficit with China, and otherwise undermine American manufacturing, services, and innovation.

The Memorandum included the following instruction:

> The United States Trade Representative shall determine, consistent with section 302(b) of the Trade Act of 1974 (19 U.S.C. 2412(b)), whether to investigate any of China's laws, policies, practices, or actions that may be unreasonable or discriminatory and that may be harming American intellectual property rights, innovation, or technology development.

Pursuant to the President's Memorandum, on August 18, 2017, the United States Trade Representative initiated an investigation under section 302(b) of the Trade Act (19 U.S.C. 2412(b)) to determine whether acts, policies, and practices of the Government of China related to technology transfer, intellectual property, and innovation are unreasonable or discriminatory and burden or restrict U.S. commerce.

B. The Chinese Government's Acts, Policies and Practices

The acts, policies and practices of the Government of China directed at the transfer of U.S. and other foreign technologies and intellectual property are an important element of China's strategy to become a leader in a number of industries, including advanced-technology industries, as reflected in China's ''Made in China 2025'' industrial plan, and other similar industrial policy initiatives. The Chinese government's acts, policies, and practices take many forms. The investigation initially will consider the following specific types of conduct:

First, the Chinese government reportedly uses a variety of tools, including opaque and discretionary administrative approval processes, joint venture requirements, foreign equity limitations, procurements, and other mechanisms to regulate or intervene in U.S. companies' operations in China, in order to require or pressure the transfer of technologies and intellectual property to Chinese companies. Moreover, many U.S. companies report facing vague and unwritten rules, as well as local rules that diverge from national ones, which are applied in a selective and non-transparent manner by Chinese government officials to pressure technology transfer.

Second, the Chinese government's acts, policies and practices reportedly deprive U.S. companies of the ability to set market-based terms in licensing and other technology-related negotiations with Chinese companies and undermine U.S. companies' control over their technology in China. For example, the Regulations on Technology Import and Export Administration mandate particular terms for indemnities and ownership of technology improvements for imported technology, and other measures also impose non-market terms in licensing and technology contracts.

Third, the Chinese government reportedly directs and/or unfairly facilitates the systematic investment in, and/or acquisition of, U.S. companies and assets by Chinese companies to obtain cutting-edge technologies and

intellectual property and generate large-scale technology transfer in industries deemed important by Chinese government industrial plans.

Fourth, the investigation will consider whether the Chinese government is conducting or supporting unauthorized intrusions into U.S. commercial computer networks or cyber-enabled theft of intellectual property, trade secrets, or confidential business information, and whether this conduct harms U.S. companies or provides competitive advantages to Chinese companies or commercial sectors.

In addition to these four types of conduct, interested parties may submit for consideration information on other acts, policies and practices of China relating to technology transfer, intellectual property, and innovation described in the President's Memorandum that might be included in this investigation, and/or might be addressed through other applicable mechanisms.

C. Relevant Provisions of the Trade Act

Section 302(b)(1)(A) of the Trade Act authorizes the United States Trade Representative to initiate an investigation to determine whether conduct is actionable under section 301 of the Trade Act.

Actionable conduct under section 301(b)(1) includes, *inter alia,* acts, policies and practices of a foreign country that are unreasonable or discriminatory and burden or restrict U.S. commerce. Unreasonable actions are those that while not necessarily in violation of, or inconsistent with, the international legal rights of the United States are otherwise unfair and inequitable.

Pursuant to section 302(b)(1)(B), the United States Trade Representative has consulted with appropriate advisory committees. The United States Trade Representative also has consulted with members of the inter-agency Section 301 Committee. On the date of initiation, the United States Trade Representative requested consultations with the Government of China concerning the issues under investigation, pursuant to section 303(a)(1) of the Trade Act (19 U.S.C. 2413(a)(1)).

Pursuant to section 304(a)(2)(B) of the Trade Act, 19 U.S.C. 2414(a)(2)(B), the United States Trade Representative must determine within 12 months from the date of initiation of the investigation whether any act, policy, or practice described in section 301 of the Trade Acts exists and, if that determination is affirmative, what action, if any, to take.

II. Request for Comments and To Testify at the Hearing

A. Topics and Schedule

The Office of the U.S. Trade Representative (USTR) invites written comments on:

1. The acts, policies, and practices of the Chinese government described in Section I.B above.

2. Information on other acts, policies and practices of China relating to technology transfer, intellectual property, and innovation as described in the President's Memorandum, which might be included in this investigation, and/or might be addressed through other applicable mechanisms.

3. The nature and level of burden or restriction on U.S. commerce caused by the applicable acts, policies and practices of the Government of China, and/or any economic assessment of that burden or restriction.

4. The determinations required under section 304 of the Trade Act, that is, whether actionable conduct exists under section 301(b) and what action, if any, should be taken.

To be assured of consideration, USTR must receive initial written comments by 11:59 p.m. on September 28, 2017, in accordance with the instructions in section II.B below.

The Section 301 Committee will convene a public hearing in the main hearing room of the U.S. International Trade Commission, 500 E Street SW., Washington DC 20436, beginning at 9:30 a.m. on October 10, 2017. Persons wishing to appear at the hearing must provide written notification of their intention and a summary of the proposed testimony by 11:59 p.m. on September 28, 2017, in accordance with the instructions in section II.B below. Remarks at the hearing may be no longer than five minutes to allow for possible questions from the Section 301 Committee. The deadline for submission of post-hearing rebuttal comments is 11:59 p.m. on October 20, 2017.

Indicate in the ''Type Comment'' field if you are submitting a request to appear at the hearing, and include the name, address and telephone number of the person presenting the testimony. A summary of the testimony should be attached by using the ''Upload File'' field. The file name should include the name of the person who will be presenting the testimony.

B. Requirements for Submissions

Persons submitting a notification of intent to testify, a summary of testimony, or written comments must do so in English, and must identify this matter (on the reference line of the first page of the submission) as ''Section 301 Investigation: China's Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation.''

To be assured of consideration, you must submit written comments, requests to testify, and summaries of testimony by 11:59 p.m. on September 28, 2017. The deadline for submitting rebuttal comments is 11:59 p.m. on October 20, 2017.

All submissions must be in English and sent electronically via *www.regulations.gov* using docket number USTR–2017–0016. You must make any alternative arrangements in advance of the relevant deadline and before transmitting a comment by contacting Gwendolyn Diggs at (202) 395–3150.

To make a submission via *www.regulations.gov,* enter Docket Number USTR–2017–0016 on the home page and click ''Search.'' The site will provide a search-results page listing all documents associated with this docket. Find the reference to this notice and click on the button labeled ''Comment Now.'' For further information on using the *www.regulations.gov* Web site, please consult the resources provided on the Web site by clicking on ''How to Use Regulations.gov'' on the bottom of the home page.

The *www.regulations.gov* Web site allows users to provide comments by filling in a ''Type Comment'' field, or by attaching a document using an ''Upload File'' field. USTR prefers that you provide submissions as an attached document. If a document is attached, it is sufficient to type ''see attached'' in the ''Type Comment'' field. USTR prefers submissions in Microsoft Word (.doc) or Adobe Acrobat (.pdf) format. If the submission is in another file format, please indicate the name of the software application in the ''Type Comment'' field. File names should reflect the name of the person or entity submitting the comments.

Indicate in the ''Type Comment'' field if you are submitting a request to appear at the hearing, and include the name, address and telephone number of the person presenting the testimony. The file name should include who will be presenting the testimony.

Please do not attach separate cover letters to electronic submissions; rather, include any information that might appear in a cover letter in the comments themselves. Similarly, to the extent possible, please include any exhibits, annexes, or other attachments in the same file as the comment itself, rather than submitting them as separate files.

For any comments submitted electronically containing business confidential information, the file name of the business confidential version should begin with the characters ''BC''. Any page containing business confidential information must be clearly marked ''BUSINESS CONFIDENTIAL'' on the top of that page and the submission should clearly indicate, via brackets, highlighting, or other means, the specific information that is business confidential. If you request business confidential treatment, you must certify that the information is business confidential and would not customarily be released to the public. Filers of submissions containing business confidential information also must submit a public version of their comments. The file name of the public version should begin with the character ''P''. The ''BC'' and ''P'' should be followed by the name of the person or entity submitting the comments or rebuttal comments. If these procedures are not sufficient to protect business confidential information or otherwise protect business interests, please contact Katherine Linton at 202–395–3150 to discuss whether alternative arrangements are possible.

We will post comments in the docket for public inspection, except business confidential information. You can view comments on the *https://www.regulations.gov* Web site by entering docket number USTR–2017–0016 in the search field on the home page.

William L. Busis,

Chair, Section 301 Committee, Office of the United States Trade Representative.

[FR Doc. 2017–17931 Filed 8–23–17; 8:45 am]

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DEPARTMENT OF TRANSPORTATION

Federal Motor Carrier Safety Administration

[Docket No. FMCSA–2017–0042]

Qualification of Drivers; Exemption Applications; Diabetes Mellitus

AGENCY: Federal Motor Carrier Safety Administration (FMCSA), DOT.

ACTION: Notice of applications for exemption; request for comments.

SUMMARY: FMCSA announces receipt of applications from 43 individuals for an exemption from the prohibition in the Federal Motor Carrier Safety Regulations (FMCSRs) against persons with insulin-treated diabetes mellitus (ITDM) operating a commercial motor vehicle (CMV) in interstate commerce. If granted, the exemptions would enable these individuals with ITDM to operate CMVs in interstate commerce.

DATES: Comments must be received on or before September 25, 2017.

ADDRESSES: You may submit comments bearing the Federal Docket Management System (FDMS) Docket No. FMCSA–2017–0042 using any of the following methods:

- *Federal eRulemaking Portal:* Go to *http://www.regulations.gov.* Follow the online instructions for submitting comments.
- *Mail:* Docket Management Facility; U.S. Department of Transportation, 1200 New Jersey Avenue SE., West Building Ground Floor, Room W12–140, Washington, DC 20590–0001.
- *Hand Delivery:* West Building Ground Floor, Room W12–140, 1200 New Jersey Avenue SE., Washington, DC, between 9 a.m. and 5 p.m., e.t., Monday through Friday, except Federal holidays.
- *Fax:* 1–202–493–2251.

Instructions: Each submission must include the Agency name and the docket number(s) for this notice. Note that all comments received will be posted without change to *http://www.regulations.gov,* including any personal information provided. Please see the Privacy Act heading below for further information.

Docket: For access to the docket to read background documents or comments, go to *http://www.regulations.gov* at any time or Room W12–140 on the ground level of the West Building, 1200 New Jersey Avenue SE., Washington, DC, between 9 a.m. and 5 p.m., e.t., Monday through Friday, except Federal holidays. The FDMS is available 24 hours each day e.t., 365 days each year. If you want acknowledgment that we received your comments, please include a self-addressed, stamped envelope or postcard or print the acknowledgement page that appears after submitting comments online.

Privacy Act: In accordance with 5 U.S.C. 553(c), DOT solicits comments from the public to better inform its rulemaking process. DOT posts these comments, without edit, including any personal information the commenter provides, to *http://www.regulations.gov,* as described in the system of records notice (DOT/ALL–14 FDMS), which can be reviewed at *http://www.dot.gov/privacy.*

FOR FURTHER INFORMATION CONTACT: Ms. Christine A. Hydock, Chief, Medical Programs Division, (202) 366–4001, *fmcsamedical@dot.gov,* FMCSA, Department of Transportation, 1200 New Jersey Avenue SE., Room W64–224, Washington, DC 20590–0001. Office hours are 8:30 a.m. to 5 p.m., e.t., Monday through Friday, except Federal holidays. If you have questions regarding viewing or submitting material to the docket, contact Docket Services, telephone (202) 366–9826.

SUPPLEMENTARY INFORMATION:

I. Background

Under 49 U.S.C. 31136(e) and 31315, FMCSA may grant an exemption from the FMCSRs for a two-year period if it finds ''such exemption would likely achieve a level of safety that is equivalent to or greater than the level that would be achieved absent such exemption.'' The statute also allows the Agency to renew exemptions at the end of the two-year period.

The 43 individuals listed in this notice have requested an exemption from the diabetes prohibition in 49 CFR 391.41(b)(3). Accordingly, the Agency will evaluate the qualifications of each applicant to determine whether granting the exemption *will achieve the required level of safety mandated by statute.*

The physical qualification standard for drivers regarding diabetes found in 49 CFR 391.41(b)(3) states that a person is physically qualified to drive a CMV if that person:

Has no established medical history or clinical diagnosis of diabetes mellitus currently requiring insulin for control.

The Agency established the current requirement for diabetes in 1970 because several risk studies indicated that drivers with diabetes had a higher rate of crash involvement than the general population.

FMCSA established its diabetes exemption program, based on the Agency's July 2000 study entitled ''A Report to Congress on the Feasibility of a Program to Qualify Individuals with Insulin-Treated Diabetes Mellitus to Operate in Interstate Commerce as Directed by the Transportation Act for the 21st Century.'' The report concluded that a safe and practicable protocol to allow some drivers with ITDM to operate CMVs is feasible. The September 3, 2003 (68 FR 52441), **Federal Register** notice in conjunction with the November 8, 2005 (70 FR 67777), **Federal Register** notice provides the current protocol for allowing such drivers to operate CMVs in interstate commerce.

FMCSA notes that section 4129 of the Safe, Accountable, Flexible and Efficient Transportation Equity Act: A Legacy for Users requires the Secretary to revise its diabetes exemption program established on September 3, 2003 (68 FR

APPENDIX B

Section 301 Investigation: China's Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation

Off-Camera Hearing to be held at the U.S. International Trade Commission

500 E Street SW., Washington DC 20436

October 10, 2017, 9:30 a.m.

Panel One

1. Richard Ellings, Commission on the Theft of American Intellectual Property
2. Stephen Ezell, Information Technology and Innovation Foundation
3. Erin Ennis, U.S. China Business Council
4. Owen Herrnstadt, International Association of Machinists and Aerospace Workers

Panel Two

1. Juergen Stein, SolarWorld Americas
2. Daniel Patrick McGahn, American Superconductor Corporation
3. William Mansfield, ABRO Industries

Panel Three

1. Scott Partridge, American Bar Association, Intellectual Property Law Section
2. Scott Kennedy, Center for Strategic & International Studies
3. JIN, Haijun, China Intellectual Property Law Society

Panel Four

1. CHEN, Zhou and LIU, Chao, China Chamber of International Commerce
2. XU, Chen and LIU, Xinze, China General Chamber of Commerce
3. John Tang, Esq. and JIANG, Qi, DHH Law Office
4. WANG, Guiqing, Chamber of Commerce, Import and Export of Machinery

APPENDIX C

Section 301 Investigation of China's Technology Transfer, Intellectual Property, and Innovation-Related Acts, Practices, and Policies: Summary of Public Submissions

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American Apparel and Footwear Association (AAFA)

AAFA is a national trade association that represents companies and suppliers in the apparel, footwear, and other sewn products industries competing in the global market. AAFA indicates that the Section 301 investigation should identify areas where China has fallen short of its IPR commitments, and it underscores that the sale of counterfeit products on Chinese e-commerce sites is widespread. AAFA draws attention to parasite brands, which it describes as "counterfeit variants" and which imitate brands and sell counterfeit versions of products in China. AAFA states that China's first-to-file trademark system leads to inadequate protections that exacerbate the problem. AAFA submits that Chinese laws and policies largely ignore the rights of patent owners by allowing or even requiring them to transfer knowledge to competitors, SOEs, or other parties.

American Bar Association Intellectual Property Law (APA IPL) Section

The ABA IPL Section provided comments in writing and at the hearing, indicating that IPR protections in China had improved in recent years but that widespread deficiencies remain. A major concern is that the Chinese government effectively forces technology transfer via the imposition of mandatory licensing terms, which may include terms on ownership in improvements, indemnifications and others. The ABA IPL Section adds that a lack of trade secret protections in China is a longstanding concern of U.S. companies, citing instances in which U.S. companies brought trade secret actions in Chinese courts and at the U.S. International Trade Commission based on allegations of trade secret misappropriations occurring in China.

Furthermore, the IPL section also identifies a range of issues with respect to trademark, copyright, and patent protections. According to the IPL section, these issues have received inadequate attention and resources from the Chinese government, and are exacerbated by Chinese copyright laws that fall short of international norms. Although several important laws and regulations have been passed by the Chinese government to enhance patent protection, additional improvements must be made to meaningfully protect the rights of patent holders. The IPL Section identifies various obstacles to U.S. patent holders attempting to pursue patent infringement actions in China.

American Bridal & Prom Industry Association, Inc. (ABPIA)

ABPIA is a non-profit, nationwide trade-association that represents members of the formalwear industry, including designers, manufacturers, retailers, and trade publications. ABPIA submits that its members are seriously harmed by the sale of counterfeit goods on "thousands" of e-commerce websites largely based in China, which target U.S. customers, including by using U.S. manufacturers' trademarks, and original and proprietary marketing

images. ABPIA also states that counterfeit goods circumvent customs duties by being falsely designed as "gifts." ABPIA recommends that USTR widen the scope of its 301 review to examine new legislation, more effective border controls, and restricting flows to the Chinese bank accounts of counterfeiters.

ABRO Industries

ABRO provided comments in writing and at the hearing, and is a small American company affected by counterfeits emanating from China. The company manufactures non-electronic consumer goods in the United States and China and sells third country markets. ABRO submits that China has received insufficient acknowledgment for its anti-counterfeiting efforts, adding that ABRO was ultimately successful in combatting the theft of its IP by adapting to the Chinese system and working closely with regional and provincial governments in China.

American Foundry Society (AFS)

AFS is a trade and technical association for the North American metal-casting industry, with more than 8,000 members representing nearly 2,000 metal-casting firms, suppliers, and customers. Many AFS members have been harmed by Chinese governmental practices in the broader metal-casting industry. China is the largest producer of all types of metal-castings, and many Chinese foundries are SOEs, which receive significant levels of both direct and indirect financial support from the Chinese government. Furthermore, the Chinese government both directly and indirectly influences commercial decisions by SOEs. Collectively, these government actions have enabled Chinese foundries to produce metal-castings at significantly lower prices than can be produced by AFS members. AFS members are additionally concerned by the implementation and localization targets published in the Made In China 2025 industrial plan. AFS submits that Chinese policies and financial supports to MIC 2025 target industries will benefit Chinese manufacturers over foreign firms, making it increasingly difficult for AFS firms to compete. Finally, AFS states that its members have suffered from investment caps in China pursuant to the *Catalogue Guiding Foreign Investment*, which forces U.S. companies to engage in joint ventures with Chinese companies in the agricultural processing, automotive, and telecom industries. These requirements create opportunities for both the Chinese government and Chinese stakeholders to request concessions like technology transfer from foreign companies during negotiations.

American Chamber of Commerce in Shanghai (AmCham)

AmCham is an independent business chamber with more than 3,000 members from over 1,500 companies, including 75 percent of American Fortune 500 companies with operations in China, along with hundreds of smaller companies. AmCham reports that its members face a difficult policy environment in China, with forced technology transfer, limited market access, and basic fairness issues increasingly shifting the local market in favor of Chinese companies. AmCham states that the Chinese government uses both implicit and explicit actions to create an unequal playing field for U.S. companies. Member companies have complained of insufficient IP protections and tech transfer pressures in the form of product approval regulations and joint venture requirements, as well as pressure to demonstrate "Good Corporate Citizenship" by

transferring new business models and technologies to Chinese entities. AmCham submits that China uses its considerable resources and influence to create an unfair advantage for its domestic companies, and these practices have made it more difficult to both operate in China and grow American companies.

American Chemistry Council (ACC)

ACC is an organization that represents the leading companies engaged in the business of chemistry. Many of ACCs members have complained of significant difficulties in bringing their products to the Chinese markets. When exporting chemicals to China, companies have been required to disclose an amount of proprietary information sufficient for product duplication. As a result, ACC members' IP has been stolen by Chinese companies, who then recreate the products and sell them at lower prices. Additionally, ACC submits that the Chinese government has engaged in both unreasonable and discriminatory practices. These include discriminatory patenting laws and the failure to pursue criminal prosecution of Chinese companies that steal IP.

American Superconductor Corporation (AMSC)

AMSC submitted comments in writing and testified at the hearing, and is an American energy technologies company that provides wind turbine designs, systems, and engineering services to reduce the cost of wind energy. AMSC experienced the theft of its intellectual property by a Chinese SOE, Sinovel Wind Group. AMSC explains that in 2007 it began supplying core electrical components and software to Sinovel. Over the course of their relationship, AMSC discovered that Sinovel had bribed an AMSC employee to steal technology from a U.S. server. AMSC submits that the theft is substantiated by emails and Skype messages that demonstrate the actual IP transfer and involvement in the cyber-theft by senior-level Sinovel officials. As a result, AMSC believes that over 8,000 wind turbines amounting to 20 percent of China's turbines are running on stolen AMSC software; and importantly, most of the wind turbines operating on stolen software are owned by large state-owned enterprises. In response to the theft, the U.S. Department of Justice brought still-pending criminal actions in the United States, while AMSC has pursued various civil legal actions in China. AMSC expresses concern that it has received fair and equitable consideration in China, as Chinese courts dismissed several of its actions for an asserted lack of evidence. AMSC states that it has lost over $1.6 billion in company value, along with 70 percent of its workforce since March 2011 as a direct consequence of the stolen technology.

Biotechnology Innovation Organization (BIO)

BIO is a non-profit organization comprised of 1,000 biotechnology companies, academic institutions, state biotechnology centers, and related organizations in almost all 50 states and a number of foreign countries. BIO members have suffered from IP theft by Chinese companies, resulting in the production of copycat products sold in China. BIO members generally share concerns in China over IPR protection and enforcement; market access challenges; innovation policies that discriminate against foreign companies; lack of transparency in rule administration; lack of meaningful industry engagement in the rules-making process; regulatory requirements

and technical standards that are more trade restrictive than necessary; and restrictive pharmaceutical pricing policies that blunt innovation in the global bioscience industry.

Bonumose Biochem LLC

Bonumose Biochem is a small, start-up business in the biochemical industry. Bonumose describes an instance of IP theft it experienced after it purchased 100 percent of the IP rights to the production of a chemical compound. According to Bonumose, an individual with ties to the Chinese government illegally revealed confidential information to the Tianjin Institute of Industrial Biotechnology (TIIB), a division of the Chinese government-owned Chinese Academy of Sciences. Bonumose submits that it is now unable to obtain a patent in China for its lawfully acquired intellectual property.

Lee Branstetter

Lee Branstetter is a Professor of Economics and Public Policy at Carnegie Mellon University. According to Prof. Branstetter, the Chinese government and its state-owned enterprises have over the past few decades extracted technology from foreign companies in a premeditated and systematic fashion, with the aim of displacing leading multinational firms with Chinese firms in global markets. He adds that technology transfer in China is neither voluntary nor market driven, but occurs under duress. Prof. Branstetter posits that foreign firms must transfer technology or be excluded from the world's largest market and multinationals that complain likely retribution. He adds that China is adept at playing foreign companies against one another, as a firm's refusal to transfer technology may lead to a market opportunity for a foreign competitor. He states further that numerous studies demonstrate that China's enforcement of its intellectual property laws is uneven and biased against foreign firms. To combat these problems, Branstetter proposes a number of legal and policy initiatives to discourage the Chinese government from engaging in these practices.

BSA | The Software Alliance (BSA)

BSA is the leading trade association representing the global software industry before governments and in the international marketplace. Both BSA and its members have significant concerns about Chinese policies and practices that limit Chinese market access and reduce the competitiveness of BSA members operating in China. Four primary areas of concern are foreign direct investment restrictions, including policies relating to Value-Added Telecommunications Services (VATS); restrictions on cross-border data transfers; disclosure requirements for source code and enterprise standards; and the development and imposition of China-specific technical standards. BSA additionally states that market access barriers work in tandem with pressures to transfer technology or intellectual property. As a result, many companies may only access the Chinese market in exchange for putting their intellectual property at risk. This amounts to U.S. businesses being forced to choose between protecting their IP or being closed out of the world's largest market for technology products.

Jack Chang

Jack Chang is an attorney with years of professional experience working in China. He serves as the Chairman of the Quality Brands Protection Committee and is presently Special Counsel to L Brands International. Previously, he served as Senior IP Counsel for Asia for General Electric from 2006 to 2014, and prior to that was in the in-house legal department of Johnson & Johnson where he helped set up the company's Asia/Shanghai Office. In his submission, Mr. Chang indicates that trademark counterfeiting, bad faith trademark registrations, copyright piracy, and the theft of trade secrets remain challenging for some businesses in China, but outlines ways in which the Chinese government has attempted to improve the IP landscape. Furthermore, Chang asserts that he has not encountered laws, policies, or practices that force technology transfer and that such transfer occur based on business considerations.

China Chamber of Commerce for Import and Export of Machinery and Electronic Products (CCCME)

CCCME submitted comments in writing and at the hearing, and is an independent, non-profit membership-based industry association based in China. CCCME and its members believe that Chinese and U.S. companies have experienced improved IP protections in China in recent years. CCCME characterizes assertions of Chinese government-driven tech transfer, forced licensing arrangements, and acquisitions as unfounded. CCCME contends that any joint ventures and transfers of technology are done free of government interference and based on market conditions. CCCME asserts that Chinese laws are not unreasonable or discriminatory because they apply equally to U.S. and Chinese companies. CCCME adds that because Chinese firms are also targeted by cyber-attacks, it is improper to blame the Chinese government for those attacks. CCCME encourages the USTR to avoid undertaking unilateral action against China and to discontinue the Section 301 investigation.

China Chamber of International Commerce (CCOIC)

CCOIC submitted comments in writing and at the hearing, and is a national chamber of commerce representing enterprises, associations, and organizations that engage in international commercial activities in China. CCOIC expresses concern that the Section 301 investigation is unilateral in nature, and cautions that action pursuant to the investigation may trigger a trade war harming businesses and individuals in both countries. CCOIC contends that there is no evidence that Chinese acts, policies, or practices are discriminatory or unreasonable, as IP protections and the overall business environment in China have substantially improved, and the Chinese government treats Chinese and foreign firms equally. CCOIC states there is no evidence that the Chinese government pressures foreign companies to transfer their technology to Chinese companies. The Chinese central government has specifically prohibited local governments from forcing technology transfer and CCOIC therefore believes that any decision to transfer or license technologies to Chinese parties is done freely pursuant to market considerations. CCOIC submits that there is no evidence that a Chinese measure governing inbound technology licensing conflicts with market-oriented principles. CCOIC contends that Chinese investment and acquisition in U.S. companies is done pursuant to normal commercial behavior without government directives. CCOIC maintains that there is no evidence that either the Chinese government or Chinese military deployed hackers to invade U.S. commercial networks for commercial interests.

China Enterprise Confederation (CEC)

CEC is a national Chinese economic organization that functions as a link between the Chinese government and Chinese businesses, with membership that consists of enterprises, entrepreneurs, and business associations. CEC maintains that China's acts, practices, and policies are neither unreasonable nor discriminatory. CEC indicates that U.S. companies are not forced to transfer technologies to Chinese companies, and that even when faced with investment restrictions, they can instead license their technologies to Chinese companies. CEC adds that China's policies and practices are consistent with international standards, and that China has significantly improved the broader business climate through better IP protections and increased market access.

China General Chamber of Commerce (CGCC)

CGCC submitted comments both in writing and at the hearing**.** CGCC is a U.S. non-profit organization that represents Chinese enterprises operating within the United States. CGCC contends that the Section 301 investigation is misguided because the acts, policies, and practices of the Chinese government are neither unreasonable nor discriminatory. CGCC outlines legal and policy reforms that strengthen IP protections in China and adds that the government has undertaken additional measures for IP protection, including the establishment of specialized IP courts and an action plan joined by 12 governmental bodies titled "The Action Plan for Protecting Foreign Companies' Intellectual Property Rights". This plan is the first of its kind, and chief amongst its goals is the implementation of harsh punishments for violations of IP rights and piracy laws.

CGCC states that U.S. companies are overwhelmingly treated as equals to Chinese domestic companies. CGCC contends that China's preferential procurement standards are not uncommon at the international level and it adds that any technology transfers or joint ventures are undertaken in good faith and free of Chinese government pressure. CGCC adds that Chinese firms operate independently of government influence, and make decisions—including those relating to acquisitions—consistent with management structures comparable to those found in U.S. firms. CGCC concludes that it is unable to comment about cyber-theft and the role that the Chinese government may play because none of CGCC's member companies have been affected.

China Intellectual Property Law Society (CIPL)

CIPL commented in writing and at the hearing, submitting that there is no basis for a determination that Chinese laws or regulations are either unreasonable or discriminatory for purposes of the Section 301 investigations. CIPL emphasizes that China's legal system is profoundly transformed, accompanied by strengthened IPR protections for both Chinese and foreign firms. CIPL provides a detailed outline of the evolution of China's IP laws and reforms beginning in the 1980s. CIPL acknowledges that further steps to strengthen IPR enforcement should be taken and it addresses a number of U.S. concerns reflected in the Section 301 investigation. CIPL also submits that there is no direct evidence of adverse impacts caused by

TIER on cross border technology transactions, and that Article 24 of TIER is consistent with free market standards of fairness.

Computing Technology Industry Association (CompTIA)

CompTIA is a non-profit trade association that represents the information technology industry. CompTIA submits that U.S. companies confront significant challenges when trying to sell IT products in China. China is implementing a number of high-level programs in an opaque fashion, which in some cases amount to discriminatory import substitution plans. CompTIA identifies a number of other protectionist policies that harm U.S. IT companies including the forced transfer of technology and IP to Chinese joint venture partners, weak enforcement against widespread IP theft, discrimination against foreign IP under the guise of national security, barriers imposed via China-specific standards, cloud computing and telecommunications market access barriers, and massive funding and subsidy programs for the development and acquisition of information and communications technologies.

Coalition of Service Industries (CSI)

CSI is the leading industry association devoted exclusively to helping a broad spectrum of America's service businesses and workers compete in world markets. CSI submits that U.S. firms face increasingly difficult competitive circumstances in China, which uses opaque rules, licensing requirements, discriminatory practices, selective regulatory enforcement, and other barriers to support Chinese firms at the expense of foreign competition. CSI adds that in spite of various commitments by China's government, the Chinese business environment continues to present significant challenges for U.S. services suppliers including in the form of localization requirements, equity caps that trigger technology transfer, and the forced submission of proprietary source code and encryption measures to Chinese officials. Affected sectors include data and technology, telecommunications, banking and securities, insurance, and express delivery.

Consumer Technology Association (CTA)

CTA represents entrepreneurs, technologists, and innovators operating within the consumer technology industry. Their membership includes companies from every facet of the consumer technology industry, including manufacturers, distributors, developers, retailers, and integrators. CTA states that its members have encountered a range of market barriers that have negatively impacted business operations in China. CTA members suffer from inadequate IPR protections in China, which contribute to rampant trademark counterfeiting and copyright piracy. Additionally, members have reported that technology transfer or IP transfer to Chinese parties is necessary in exchange for market access. CTA acknowledges that it is unaware of official laws "on the books" that require technology transfer, it reports that officials pressure foreign companies to transfer technology through oral communications to limit the creation of written evidence. CTA adds that "secure and controllable" standards discriminate against foreign technology; and although CTA acknowledges that some "secure and controllable" laws have been repealed, it submits that others still are simply re-named or re-implemented at the provincial or local levels. CTA states that it has received "numerous" reports of individuals

with ties to the Chinese government who have hacked U.S. companies' computer networks to steal proprietary data and IP with the intent of assisting Chinese industry.

Dais Analytic Corporation (Dais)

Dais creates nanotechnology-based applications for heating and cooling, water treatment, and energy storage. It commends China for improvements in IPR protections and enforcement, but identifies key areas for improvement, including IPR protections embodied in employment agreements and the need for public disclosure of all rules and regulations governing joint ventures. Dais explains that a potential Chinese joint venture partner cited the requirements JV rules and regulations that were not clearly and publicly outlined to pressure Dais to disclose its sensitive IP, which the Chinese company used improperly.

DHH Washington DC Law Office (DHH)

DHH provided comments in writing and at the hearing, and is the Washington, D.C. branch of the Beijing DHH law firm, which focuses primarily on servicing U.S. and Chinese clients on international trade matters and cross-border investment. DHH provides background on provision of China's patent, copyright, and trademark laws, and notes the creation of specialized intellectual property courts in China. DHH asserts that Chinese practices related to tech transfer, IP protections, and innovation are not unreasonable or discriminatory and do not burden or restrict U.S. commerce. DHH submits that IP protections have significantly improved over the last few decades. DHH also contends that Chinese acquisitions of U.S. companies are market driven and are not directed by the Chinese government.

International Association of Machinists and Aerospace Workers, (IAM) AFL-CIO

IAM, which provided comments in writing and at the hearing, represents several hundred thousand active and retired workers throughout North America. IAM contends that the U.S. transfer of technology to China has negatively affected U.S. aerospace workers. China has relied on transferred production and other technology from Western companies to develop its domestic aerospace industry, and in the process, China has pitted Western competitors against one another for access to China's growing aviation market. This dynamic negatively impacts the U.S. industrial base in different, but related ways, including the loss of jobs and skills associated with the transferred technology and production, additional job losses occurring as China uses transferred technologies to develop its own aerospace companies that will compete directly with U.S. aerospace firms and their suppliers, and job losses in technological production.

Commission on the Theft of Intellectual Property (IP Commission)

The IP Commission provided comments in writing and at the hearing, and is an independent and bipartisan initiative of American leaders in both the private and public sectors formed in 2012 to document and assess the causes, scale, and dimensions of international intellectual property theft. The IP Commission finds China to be the worst infringer of American IP, stemming primarily from Chinese policies and laws. While the IP Commission identifies recent improvements including specialized IP courts and a new IP enforcement "Action Plan," IP

Commission data and other studies show a strong link between China's stated industrial priorities and IP theft.

Additionally, the Commission cites examples of "brazen" Chinese attempts to steal American intellectual property, including the targeting of American industrial tradeshows to elicit sensitive information from firm representatives; the systematic tracking of the National Science Foundation grantees and research of scientists at universities across the nation; the attempted theft of Medrobotics intellectual property; the theft and attempted sale of IBM's source code by a former IBM software engineer to China's National Health and Family Planning Commission; the attempted acquisition of U.S. nuclear secrets from the Tennessee Valley Authority by a Chinese national and China Nuclear Power, an SOE; and the hacking of the computer networks of major U.S. defense contractors resulting in the theft of sensitive military and export controlled data by a Chinese national. In the view of the IP Commission, these examples collectively suggest rampant Chinese theft of American IP and sensitive information.

The Commission indicates that China effectuates forced technology transfer and theft including via industrial espionage, conditioning market access on technology transfer, tactical employment of vague regulations and laws to pressure U.S. firms into transferring their IP to avoid litigation, and localization requirements that force U.S. firms to house sensitive data on the Chinese mainland. According to the IP Commission, these practices inflict significant damage to every sector of the U.S. economy. While precise quantification of these damages is difficult, the Commission draws on a variety of data sources, proxies, and economic models to estimate that Chinese theft of American IP currently costs between $225 billion and $600 billion annually.

Information Technology Industry Council (ITI)

ITI is a policy and advocacy organization for innovation companies. ITI submits that China is a crucial, yet difficult market for companies in the technology sector. ITI points to restrictions on cross-border data flows, requirements for disclosure of IP, and discrimination against U.S. cloud services providers as creating significant negative impacts on U.S. technology companies. ITI adds that the *Cybersecurity Law*, along with subsequent guidance and regulations, is particularly problematic for U.S. technology companies. In particular, ITI states that firms in the cloud services industry may be forced to transfer valuable IP, surrender use of their brand names, and hand over operation and control of their businesses to Chinese companies in order to participate in the Chinese market. ITI provides that initiation of a JV may be valuable under certain circumstances, but that JV requirements in China are problematic when required and when the Chinese partner's control over the JV is non-negotiable. ITI raises concerns over Chinese standard setting that is inconsistent with pre-established international standards, along with "secure and controllable" standards that discriminate against foreign technologies.

Information Technology & Innovation Foundation (ITIF)

ITIF provided comments in writing and at the hearing, and submits that China has systematically ignored the spirit—and often the letter—of its commitments under its WTO obligations. According to ITIF, in China's quest to become a global innovation leader, it assimilates foreign technologies through tech transfer inducements, mandates joint ventures, and

conditions market access in exchange for transfer of important IP. ITIF further submits that the Chinese state directs M&A and FDI activity to target and acquire foreign enterprises with leading technologies in key industrial sectors, ranging from semiconductors to manufacturing. ITIF adds that these acquisitions and investment in foreign companies are often orchestrated by SOEs to serve strategic state goals. ITIF states that Chinese acquisitions are complemented by aggressive cyber-theft programs to steal key foreign technologies and knowledge. ITIF provides that together, these mercantilist policies pose a direct and existential threat to the U.S. advanced technology industry as a whole, and have caused an estimated 3.4 million American job losses from 2001 to 2015.

Scott Kennedy, Center for Strategic & International Studies

Scott Kennedy commented in writing and at the hearing, and is the Deputy Director, Freeman Chair in China Studies and the Director for the Project on Chinese Business and Political Economy at CSIS. In his submission, Kennedy stresses the widespread impact that Chinese IP policies and practices have on the structure of supply chains and the health of business models. China's broad industrial policy is to drive its economy up the value-added chain and toward advanced technologies. To effectuate these industrial goals, China has developed policies that foster technological creation and innovation, and encourage foreign acquisitions through both cooperative and coercive means. While Mr. Kennedy acknowledges that unilateral penalties may be appropriate, he maintains that any action undertaken by the United States should be accompanied by: 1) long-term engagement with stakeholders in China; 2) support for international fora like the WTO, that develop IP standards and adjudicate disputes; 3) collaboration with U.S. allies and other nations harmed by Chinese practices; and 4) strengthening of the legal, educational, and commercial environment for IP protection and development within the United States.

Dr. Catherine Lin-Hendel

Dr. Lin-Hendel is a small business owner who has experienced patent infringement by Chinese SOEs. Dr. Lin-Hendel submits that the value of her intellectual property which has been stolen is upwards of hundreds of millions of dollars. She further states that all of the infringing entities' websites—which utilize her intellectual property—are accessible from the United States. Dr. Lin-Hendel also states that she has attempted to resolve the dispute with the infringing entities, but has been unable to do so in China. In addition to her written submission, Dr. Lin-Hendel provides a number of letters, emails, and tables outlining her various patents which have been infringed.

The Los Angeles Area Chamber of Commerce (LACC)

LACC is a business association representing companies in the greater Los Angeles area. LACC recommends that the USTR drop the 301 investigation, and instead address IP concerns in a "more precise and effective" manner that will not negatively affect the positive aspects of the U.S. relationship with China.

James Lewis, Center for Strategic and International Studies

CSIS is a bipartisan, non-profit policy research organization. James Lewis submits on behalf of CSIS that the central issue with respect to the 301 investigation is not IP theft, but the unfair treatment of U.S. companies in China. Mr. Lewis outlines the range of policy tools utilized by the Chinese government to build "national champions" and drive economic growth. These include the licit and illicit acquisition of foreign technologies, generous subsidies and non-tariff barriers, abuse of power by the Chinese government to extract concessions or block foreign competition in the Chinese market, forcible coproduction policies, and IP theft and cyber espionage. According to Mr. Lewis, IP theft and cyber-espionage are of particular concern because they play an important role in the acquisition of technologies necessary to drive the broader Chinese industrial policy. Additionally, Mr. Lewis provides that many companies have been complacent in pushing back against illicit Chinese activity for fear of retribution; and many do not believe the U.S. will take action to support them against Chinese retaliation.

Motor & Equipment Manufacturers Association (MEMA)

MEMA represents 1,000 vehicle suppliers that manufacture and remanufacture new original equipment and aftermarket components and systems for use in passenger cars and heavy trucks. MEMA submits that China is a large and important trading partner for its member companies but that the China market remains a challenge for motor vehicle suppliers. MEMA states that policies and practices that place IPR at risk include technology localization requirements stemming from with government industrial planning; a pending ban on the use of Virtual Private Networks; China's cybersecurity laws; its system of duties and value added taxes that is increase usage of counterfeit products; and the inadequate enforcement of IP laws.

Michelman

Michelman is a family-owned small business that develops and manufactures materials for coatings used in printing, food and medical packaging, advanced composite materials, and industrial manufacturing. Michelman states that the IPR landscape in China has improved, and that violations of IP laws in China no longer take place with impunity. Michelman adds that, a number of challenges remain in IP protection in China. In 2016, Michelman discovered that four Chinese companies were selling primer for digital printers with strikingly similar profiles to the primer that Michelman had sold in China for several years. After conducting an analysis of the primers, Michelman suspects that the products sold by the Chinese companies are in fact relabeled Michelman primers. At this stage, Michelman has only consulted with outside legal counsel, but believes that to take even low-level action (e.g. a cease and desist letter) against the suspected companies could result in crippling retaliatory legal action.

National Association of Manufacturers (NAM)

NAM is the largest manufacturing association in the United States, representing more than 14,000 businesses of all sizes in every industrial sector and in all 50 states. NAM submits that the Chinese market is a consistent trouble spot for U.S. manufacturers, as they face a range of market-distorting and harmful industrial policies. These including investment restrictions, licensing and approval processes, localization requirements, measures that encourage technology

transfer and restrict cross-border data flows, weaknesses in trade secrets protections, and policies and enforcement practices in IP-related areas such as standards-setting and competition law.

National Foreign Trade Council (NFTC)

NFTC represents more than 200 companies, with membership spanning the U.S. economy. NFTC states that overall IP landscape in China is improved, but that foreign firms and investors continue to face innovation-related difficulties in China. NFTC outlines challenges that disadvantage foreign firms including the indigenous innovation product accreditation system, measures that preclude U.S. companies from offering cloud services in China except by transferring valuable IP and control of operations to Chinese companies, poor trade secrets protections, disclosure requirements in standards creating processes, technology licensing measures, and others.

Congressman Bill Pascrell

Congressman Pascrell is the Ranking Member of the House of Representatives Ways and Means Subcommittee on Trade. He expresses the concern that a number of Chinese policies and practices diminish IP rights in China, including burdensome approval requirements for the import and export of clinical investigational materials, and discrimination against innovators lacking localized manufacturing capacities. Congressman Pascrell calls on the Chinese Food and Drug Administration to establish an a patent dispute resolution mechanism prior to the marketing of generic competition and spotlights increasing sales of falsified and counterfeit medicines in China that not only violate intellectual property rights but pose health and safety risks.

Pharmaceutical Research and Manufacturers of America (PhRMA)

PhRMA represents companies that invent, manufacture, and distribute valuable medicines globally. In its submission, PhRMA states that the pharmaceuticals industry holds longstanding concerns over lack of regulatory data protection, ineffective patent enforcement, and inconsistent patent examination guidelines. PhRMA outlines a series of proposed Chinese policies and reforms in regulatory data protection, patent enforcement, and patent examination that may address its member companies' longstanding concerns. It contends that continued engagement by the U.S. and other stakeholders will help ensure the full implementation of these necessary reforms.

Rhodium Group

Rhodium is an economic research firm that combines policy experience, quantitative economic tools and on-the-ground research to analyze disruptive global trends. Rhodium outlines key findings from its long-term study of Chinese FDI in the United States. Rhodium notes that Chinese investment has significantly increased in the U.S., and has spread to all sectors of the U.S. economy, and it adds that while data do not support any definitive conclusions about causality between industrial policy and Chinese investment patterns in general, the relationship between industrial policy and targeted investment in individual sectors is readily apparent. Rhodium cites the example of the semiconductor industry, where both

private investors and Chinese government funds have embarked on an unprecedented buying spree of assets along the semiconductor production chain in Asia, Europe, and North America. Rhodium also states that further analysis of drivers of Chinese FDI must be undertaken to better understand the relationship between the recent and extraordinary deployment of state financing with "traditional" FDI transactions.

Semiconductor Industry Association (SIA)

SIA represents the U.S. semiconductor industry, which is one of America's top export industries. SIA asserts that China pressures U.S. semiconductor companies to develop their IP within China, or transfer their IP to Chinese entities. This practice has long concerned U.S. firms across sectors, and has continued to plague the semiconductor industry in spite of a decade of dialogue on this issue. SIA provides that China has made progress in conforming to the rules-based trading system since its WTO accession, however SIA's member companies continue to experience challenges in China. SIA states that Chinese state directed subsidies in the form of investment funds, credit lines, and grants target companies and technologies at all levels of the semiconductor development and fabrication lifecycle. SIA adds that semiconductor companies face pressure to disclose or transfer their IP. This pressure is exhibited in a variety of laws, rules, and policies that may induce or force the localization of semiconductor design or manufacturing processes to achieve compliance and induce technology transfer as a condition of market access. SIA points to further challenges semiconductor firms have experienced, including secure and controllable requirements, the imposition of non-market terms in licensing and technology contracts, widespread counterfeiting, and the theft or misappropriation of trade secrets and other IP.

Skadden, Arps, Slate, Meagher & Flom, LLP (Skadden)

Skadden's submission is on behalf of a client that has operated in China and has suffered from intellectual property theft. The theft caused a loss of millions of dollars of sales, market share, good will, and reputation. The submission contains extensive business confidential information and thus has received confidential treatment.

SolarWorld

SolarWorld submitted comments in writing and at the hearing. SolarWorld is one of a group of U.S. entities targeted by five Chinese military hackers in May 2014. SolarWorld submits that the Chinese government-backed theft of its intellectual property inflicted a particularly acute injury to the company, along with other U.S. solar manufacturers. SolarWorld provides that government-subsidized Chinese solar cells and panels that benefitted from the stolen trade secrets have flooded the U.S. market since 2012. According to SolarWorld, this has driven nearly 30 U.S. manufacturing firms out of business and has left the U.S. solar manufacturing industry on the brink of collapse. SolarWorld adds that the DOJ indictment against Chinese military hackers outlines the scope of the hack, along with the degree of involvement of Chinese SOEs, and the orchestrated timing of the hack with the dumping of solar panels into the U.S. market.

Stewart and Stewart

Terence P. Stewart is the managing partner of Stewart and Stewart, a firm that has represented various U.S. manufacturing and agricultural industries in trade proceedings and negotiations. Stewart submits that the United States should be deeply concerned about China's laws, regulations, and practices that distort trade flows and restrict foreign technology leaders, leading to unsustainable trade imbalances. Stewart describes industries that have been subject to technology transfer requirements, including in the automotive, semiconductor, and high speed rail sectors. Technology transfer requirements are imposed on firms in these industries through forced joint venture requirements and the imposition of technology licensing terms. Stewart notes the elimination of explicit technology transfer requirements in the Chinese automotive sector, but submits that subsequently enacted policies achieve technology transfer using less explicit means. Stewart provides a detailed outline of China's WTO accession obligations, and reiterates concerns laid out in previous USTR reports on China.

Telecommunications Industry Association (TIA)

TIA represents approximately 250 manufacturers and suppliers of high-tech telecommunications networks and services in the U.S. and around the world. TIA members are concerned over China's growing slate of security rules that disadvantage U.S. exporters. In its submission, TIA outlines specific policies and their attendant authorizing legislation,that are harmful to its members. These include: security testing of ICT products by the Chinese government as a requirement for market entry; equity caps and operational restrictions on cloud computing; restrictions on cross-border data flows; standards-setting approaches that depart from global norms; and the implementation of its competition policy. TIA adds that China is increasingly excluding foreign ICT equipment from many Chinese information networks in a variety of industries.

US-China Business Council (USCBC)

USCBC, which testified at the hearing, represents 200 American companies engaged in business across all industries and sectors in China. In its submission, USCBC references a number of surveys it conducted with its member companies that demonstrate significant concerns over technology transfer and IP protections in China. USBC firms report slow improvement in Chinese IP protections, and many also face acute tech transfer pressure. USCBC firms view China's IP protections as slowly improving. To effectuate tech transfer, USCBC firms cited the use of opaque and discretionary administrative approval processes, mandatory joint venture requirements, foreign equity limitations, discriminatory government procurement programs, and preferences for localization and domestic IP. USCBC adds that U.S. companies seeking to operate in China face an unbalanced negotiating environment. Although negotiations involving tech transfer or other equity restrictions are generally part of normal business negotiations, USCBC states that Chinese companies have an inherently stronger position relative to their foreign negotiating partners. USCBC recommends that the U.S. should pursue improved IP protections for American firms through reforms of harmful Chinese policies, but urges the USTR to avoid protectionism and seek reforms consistent with market-driven principles.

U.S. Chamber of Commerce

The U.S. Chamber is the world's largest business federation representing the interests of more than 3 million businesses of all sizes, in all sectors and regions, as well as state and local chambers and industry associations. The Chamber submits that insufficient IP protections is consistently one of the top regulatory challenges facing Chamber members. The Chamber outlines a number of core elements of China's regulatory regime that are both restrictive and burden U.S. companies. These include: equity caps that create investment barriers; state sponsored acquisitions of R&D intensive products; administrative licensing procedures which enables the state to influence negotiations between Chinese and foreign companies, resulting in non-market based terms; discriminatory technology licensing policies; discriminatory standards-setting practices; forced security reviews that expose source code and other sensitive IP; and localization requirements that discriminate against foreign companies and make IP vulnerable to exposure. The Chamber further emphasizes that there is a fundamentally asymmetric playing field, where foreign companies face immensely restrictive policies and barriers when trying to operate in China, while Chinese companies face few to no reciprocal barriers when operating in global markets.

United States Council for International Business (USCIB)

USCIB members include top U.S. based global companies and professional services firms from every sector of the economy, with operations in every region of the world. USCIB identifies a range of Chinese government policies and practices that disadvantage U.S. firms relative to their Chinese competitors. Specifically, USCIB submits that China is utilizing its Anti-Monopoly Law in a discriminatory manner to target foreign companies' intellectual property, and as a policy tool to support its national industrial policy objectives. The discriminatory application of this law is aided by procedural inadequacies that make it difficult for companies to mount an effective defense. USCIB additionally points to FDI limitations and joint venture requirements in a number of sectors, which limit competition and encourage the transfer of technology to Chinese companies. USCIB also describes how the *Cybersecurity Law* and related measures disadvantage U.S. companies in the Chinese market.

United States Steel Corporation (U.S. Steel)

U.S. Steel asserts that the Chinese government has been conducting cyber-theft operations in the United States against American companies for years and that U.S. Steel was the subject of Chinese cyber-hacking attacks on the company's network, and another attack involving phishing that resulted in the exfiltration and exploitation of its confidential business information. While U.S. Steel notes that the United States indicted five Chinese military officials for computer hacking and economic espionage in connection with the hacks of U.S. Steel and others, it states that no further action was taken on behalf of the victims. U.S. Steel recommends that the scope of the investigation include how to improve procedures and perhaps trade laws such that victims of cyber-theft can obtain redress.

Wiley Rein, LLP

Wiley Rein is a law firm based in Washington, D.C. Wiley submits that a web of industrial policies is designed to absorb, assimilate, and re-innovate foreign technology and IP to help Chinese firms gain a global advantage across a broad spectrum of industries. Wiley outlines a variety of Chinese policies designed to provide competitive advantages to Chinese firms, including via industrial policy and state support for technology acquisitions, overbroad national security laws and regulations; state-supported theft of trade secrets and other IP, and biased enforcement of the competition law. Wiley concludes that the Chinese government engages in a wide variety of unreasonable and discriminatory policies and practices that significantly burden U.S. commerce by causing U.S. companies to suffer direct harm. Wiley submits that these policies and practices ultimately inhibit companies' ability to invest in future growth and innovation.

YANG Gouhua

Yang Gouhua is a Professor of Law at Tsinghua University in Beijing, China. Prof. Yang submits that the transfer of technology to a Chinese enterprise, and the terms of those transfers are a product of voluntary agreements undertaken by the parties. He further asserts that there is no external intervention which forcibly pressures firms to transfer technology. Prof. Yang also states that non-market based licensing schemes merely safeguard the legitimate rights and interests of licensees, who he asserts hold a weak position in international technology transfer negotiations. Prof. Yang also submits that Chinese acquisitions in the United States are normal commercial activities not subject to the central government's direction, and that both the United States and China should work to strengthen cooperation to combat cybercrime.

Stephen Zirschky

Stephen Zirschky is an attorney with over 30 years of experience working in-house in multinational corporations, and has been engaged in extensive business transactions with Chinese companies since 1994. He states that there is a clear system of discretionary administrative approval processes, along with other restrictions, adopted by China that pressure transfer of IP to Chinese companies and/or SOEs. Mr. Zirschky states that often the language in Chinese licensing and business registration forms are unclear on technology transfer requirements, but officials within regional Chinese centers clarify in person that transfer of technology is expected. Subsequent to the induced technology transfer, governmental agencies or SOEs obtain the technology "for review", and U.S. companies then discover their product has been copied and sold by different Chinese companies. Mr. Zirschky explains that many companies do not come forward to comment on this practice out of fear that they will lose access to the Chinese market.

APPENDIX D

2017 Catalogue Guiding Foreign Investment "Restricted" Category Industries

	Sector	Chinese co-investor req.?	Chinese investor control req.?	Specific foreign ownership caps (if specified) and other restrictions
	Agriculture, Forestry, Animal Husbandry, Fishery and Related Industries			
1	Selection and breeding of new types of agricultural goods, and production of seeds	X	X	
	Mining			
2	Exploration and development of oil and natural gas (including coalbed methane, oil shale, oil sands and shale gas)	X (CJVs/EJVs only)		
3	Surveying and mining of special and rare coal	X	X	
4	Surveying and mining of graphite			
	Manufacturing			
5	Publications printing	X	X	
6	Rare earth smelting, separation, and tungsten smelting	X (CJVs/EJVs only)		
7	Manufacture of whole vehicles and special vehicles	X		Chinese parties shall hold no less than 50% of shares. Each foreign party can have max. 2 JVs manufacturing the same type of vehicles (passenger/ commercial/ motorcycle). If foreign co.'s Chinese partner merges with another domestic auto manufacturer, foreign company not bound by the "2 JV" limit
8	Design, manufacture and repair of ships (including subparts)	X	X	
9	Trunk, regional aircraft design, manufacturing and maintenance, 3-ton and above helicopter design and manufacturing, ground, surface effect of aircraft manufacturing and unmanned aerial vehicles, manufacture of aircraft for ground or water surface effects; design and manufacture of unmanned aerial vehicle and aerostatics	X	X	
10	General aircraft design, manufacture, and maintenance	X (CJVs/EJVs only)		
11	Production of satellite television receiving and broadcasting equipment and key parts			
	Electricity, Gas, and Water Production and Supplies			
12	Construction and operation of nuclear power plants	X	X	
13	Construction and operation of electricity grids	X	X	
14	Construction and operation of gas, heat supply, and water drainage networks in cities with a population of more than 500,000	X	X	
	Transportation, Shipping, Storage, and Postal Industries			
15	Construction and operation of main line railroad networks	X	X	
16	Passenger train transportation companies	X	X	
17	Domestic water transport companies / international maritime transport companies	X (Int'l maritime transport cos. are CJVs/EJVs only)	X (Domestic water transport cos.)	
18	Construction and operation of civil airports	X	X	
19	Public air transport company	X	X	Foreign and affiliated enterprise investment not to exceed 25% and the legal representative shall have Chinese nationality
20	General aviation companies – agricultural, forestry, and fisheries-related general aviation companies	X (Ag. / forestry / fisheries-related general aviation cos. must be JVs)	X (Other general aviation cos.)	Company's legal representative must have Chinese nationality

	Information Transmission, Software, and IT Services			
21	Telecommunications companies	X	X	**Value-added telecom services**: foreign investment ratio no more than 50%, except e-commerce; **basic telecom business**: Chinese majority control
	Wholesale and Retail Trade			
22	Procurement and wholesale of rice, wheat, and corn			
23	Shipping agents	X	X	
24	Construction and operation of gas stations	X	X	Retail operations over 30 chain stores established by the same foreign investor that sell different types and brands from multiple suppliers must have majority Chinese control
	Finance and Insurance			
25	Banks	X	X	Individual Chinese commercial banks: no one foreign financial institution or the affiliates it controls or jointly controls as a founder or a strategic investor shall own more than 20%; no combination of foreign financial institutions or the affiliates they control or jointly control as a founder or strategic investor shall own more than 25%
26	Insurance companies	X		Foreign stake in life insurance companies must not exceed 50%
27	Securities companies	X	X	
28	Future trading companies	X	X	
	Leasing and Business Services			
29	Market research	X (Generally CJVs/EJVs only)	X (Radio/TV listener/viewership market research must be Chinese majority controlled)	
	Scientific Research, Technology Services, and Geological Survey Industries			
30	Survey and mapping companies	X	X	
	Education			
31	Pre-school, general, high school, and higher education institutions –	X (CJVs only)	X	Pre-schools, ordinary senior high schools, and higher learning institutions are limited to Chinese parties playing the leading role
	Healthcare and Social Work Services			
32	Medical institutions	X (CJVs/EJVs only)		
	Cultural, Sports, and Entertainment Companies			
33	Radio and television program production and film production	X (CJVs only)		
34	Construction and management of movie theaters	X	X	
35	Performance agency companies	X	X	

Source: *Catalogue of Industries for Guiding Foreign Investment (2017Amendment)* (NDRC and MOFCOM, Order No. 4, issued June 28, 2017).

Note that the above list reflects all the industries in the "restricted" category. Not all of "restricted" industries are subject to JV requirements. Some "restricted" industries are also included in the "encouraged" list

APPENDIX E

Appendix E: Statement of the Office of IP and Industry Research Alliances (IPIRA) at the University of California, Berkeley

The Office of IP and Industry Research Alliances (IPIRA) at the University of California, Berkeley, licenses its inventions and other IP rights around the world for various purposes, including humanitarian purposes. Companies in China sometimes inform IPIRA that TIER imposes mandatory terms to all entities licensing or importing technologies into China. For the following three reasons the Regents of the University of California (through UC Berkeley) is unable to accept the following terms:

(1) TIER requires the University (the licensor) to guarantee that the University's IP rights do not infringe other IP rights, including those that are owned by third parties. It is not feasible for the University to make this determination. It is the company's own due diligence to perform. Even if the University were to perform a relevant search and analysis in an attempt to meet the requirement, the search and analysis result would immediately become obsolete due to the issuance of patents and/or creation of new IP rights anywhere around the world. In a typical license the search and analysis, i.e., a "freedom to operate analysis" and/or an "infringement analysis" is a duty that falls to the licensee (based on the products it intends to commercialize), not the licensor. The University's license states that it makes no representation that practice of the licensed rights do not infringe other IP rights.

(2) TIER requires the University to guarantee or warrant that a given IP right is suitable for, or must work for, a particular commercial purpose. This requirement goes beyond what the University can accept or state in an IP license. Instead, the University in all of its licensing transactions states the opposite, that the IP rights are provided without warranty or guarantee or suitability for a particular commercial purpose. That is, put simply, the provided rights are merely IP rights that were invented in the course of performing research, not a product.

(3) TIER's mandatory provision on improvements is similarly unacceptable to the University. The University always reserves the right to practice the licensed invention for its own educational and research purposes. It also extends that right to others in the nonprofit sector. The University needs the freedom to continue to practice the invention and to make improvements for and on its own behalf (and for the global nonprofit research community). If the University were to agree on the future disposition of yet-to-be invented improvements, that agreement could stifle research, academic freedom, and could sweep in the rights of future inventors (or authors of copyrights) without their knowledge or consent. Typical university IP licenses limit the scope to a stated priority patent application and claims in continuing (and/or corresponding foreign patents) that are entitled to the priority filing date of that application. Since the University is unable to accept the TIER terms stated above, in order to mitigate and minimize risks, the University has to identify a licensee that can accept standard terms in these areas – for example, a U.S. affiliate of a Chinese company. The University has been informed that Chinese IP law is in a state of flux and that the former demands may not be required in every license in every situation. The University is submitting the items above, with the hope that changes to Chinese IP law will give Chinese licensees more latitude in obtaining IP rights that arise from academic research.

EXHIBIT 165

USTR Releases 2024 Special 301 Report on IP Protection – China Remains on the Priority Watch List

April 29, 2024 Share this article

On April 25, 2024, the Office of the United States Trade Representative (USTR) today released its 2024 Special 301 Report on the adequacy and effectiveness of U.S. trading partners' protection and enforcement of intellectual property (IP) rights. China remains on the priority watch list with the USTR stating:

there remain many serious concerns regarding IP protection and enforcement in the People's Republic of China (PRC). In 2023, the pace of reforms in the PRC remained slow. Stakeholders continue to raise concerns about implementation of the amended *Patent Law*, *Copyright Law*, and *Criminal Law*, as well as about long-standing issues like technology transfer, trade secrets, bad faith trademarks, counterfeiting, online piracy, and geographical indications. Also, statements by Chinese officials that tie IP rights to Chinese market dominance still raise strong concerns. The United States continu monitor closely the PRC's progress in implementing its commitments under the United States-C Economic and Trade Agreement (Phase One Agreement).

2024 Special 301 Report

Office of the United States Trade Representative

For ease of reference, the China section is reproduced below. The full report is available here.

China remains on the Priority Watch List in 2024 and is subject to continuing monitoring pursuant to Section 306 of the Trade Act of 1974, as amended (19 U.S.C. § 2416).

Ongoing Challenges and Concerns

In 2023, the pace of reforms in China aimed at addressing intellectual property (IP) protection and enforcement remained slow. Stakeholders acknowledge some positive developments but continue to

raise concerns about implementation of the amended Criminal Law, Copyright Law, and Patent Law. Stakeholder concerns remain about long-standing issues including technology transfer, trade secrets, counterfeiting, online piracy, copyright law, and patent and related policies. China needs to complete the full range of fundamental changes that are required to improve the IP landscape in China.

Statements by Chinese officials that tie IP rights to Chinese market dominance continue to raise strong concerns. For example, the president of the Supreme People's Court (SPC) wrote in a 2021 essay that the courts should serve the Chinese Communist Party and industrial policy goals. Following a June 2022 statement in which President Xi stressed the need for China to allow no delays in breaking through the "chokehold" of critical core technologies, Chinese officials and judges have continued to publish statements highlighting their efforts in that regard. Such statements recall long-standing concerns about requiring or pressuring technology transfer from foreign individuals or companies to Chinese companies, as well as about whether IP protection and enforcement will apply fairly to foreign right holders in China. China should provide a level playing field for IP protection and enforcement, refrain from requiring or pressuring technology transfer to Chinese companies at all levels of government, open China's market to foreign investment, and embrace open, market-oriented policies.

Under Section 301 of the Trade Act of 1974, as amended (19 U.S.C. § 2411) (Section 301), the Office of the United States Trade Representative (USTR) has been taking action to address a range of unfair and harmful Chinese acts, policies, and practices related to technology transfer, IP, and innovation. USTR has also successfully pursued dispute settlement proceedings at the World Trade Organization (WTO) to address discriminatory licensing practices. The United States and China signed the United States-China Economic and Trade Agreement (Phase One Agreement) in January 2020, which included commitments to address numerous long-standing concerns in the areas of trade secrets, patents, pharmaceutical-related IP, trademarks, copyrights, geographical indications (GIs), and technology transfer. The United States has been closely monitoring China's progress in implementing its commitments.

China's Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation

In 2018, USTR reported that its investigation under Section 301 found that China pursues a range of unfair and harmful acts, policies, and practices related to technology transfer, IP, and innovation. These include investment and other regulatory requirements that require or pressure technology transfer, substantial restrictions on technology licensing terms, direction or facilitation of the acquisition of foreign companies and assets by domestic firms to obtain cutting-edge technologies, and conducting

and supporting unauthorized intrusions into and theft from computer networks of U.S. companies to obtain unauthorized access to IP.

In March 2018, the United States initiated a WTO case challenging Chinese measures that deny foreign patent holders the ability to enforce their patent rights against a Chinese joint-venture partner after a technology transfer contract ends and that impose mandatory adverse contract terms that discriminate against and are less favorable for imported foreign technology as compared to Chinese technology. Consultations took place in July 2018, and a panel was established to hear the case at the United States' request in November 2018. In March 2019, China announced the withdrawal of certain measures that the United States had challenged in its panel request, including the Regulations on the Administration of Import and Export of Technologies. The United States considered that China's actions had sufficiently addressed U.S. concerns, and the authority of the panel expired on June 9, 2021.

As part of the Phase One Agreement, China agreed to provide effective access to Chinese markets without requiring or pressuring U.S. persons to transfer their technology to Chinese persons. China also agreed that any transfer or licensing of technology by U.S. persons to Chinese persons must be based on market terms that are voluntary and mutually agreed, and that China would not support or direct the outbound foreign direct investment activities of its persons aimed at acquiring foreign technology with respect to sectors and industries targeted by its industrial plans that create distortion. In addition, China committed to ensuring that any enforcement of laws and regulations with respect to U.S. persons is impartial, fair, transparent, and non-discriminatory. USTR continues to work with stakeholders to evaluate whether these commitments have resulted in changes in China's ongoing conduct at the national, provincial, and local levels.

Trade Secrets

Stakeholders report that judicial enforcement of trade secret protections continues to be weak, and implementation of the amended Criminal Law remains incomplete. In January 2023, the SPC and Supreme People's Procuratorate (SPP) issued for public comment a draft Interpretation of Several Issues Concerning the Application of Laws for Handling Criminal Cases of Infringement upon Intellectual Property Rights, which would define key terms in the amended Criminal Law. However, further changes are needed to implement a new threshold for triggering criminal investigations and prosecutions in the draft Interpretation and to update a related standard issued by the SPC and Ministry of Public Security. Moreover, stakeholders continue to identify significant enforcement challenges, including high evidentiary burdens, limited discovery, difficulties meeting stringent

conditions to enforce agreements related to protection of trade secrets and confidential business information against theft, and difficulties in obtaining deterrent-level damages awards.

China needs to address concerns regarding the risk of unauthorized disclosures of trade secrets and confidential business information by government personnel and third-party experts, which continue to be a serious concern for the United States and U.S. stakeholders in industries such as software, manufacturing, and cosmetics. The draft Guiding Opinions on Strengthening the Protection of Trade Secrets and Confidential Business Information in Administrative Licensing was published for public comment in August 2020 by the Ministry of Justice but has not been finalized. U.S. stakeholders continued to express concerns about the potential for discriminatory treatment and unauthorized disclosure of their information by local authorities under the proposed expansion of administrative trade secret enforcement, for which the State Administration of Market Regulation (SAMR) issued draft rules in 2020 that have not been finalized.

Manufacturing, Domestic Sale, and Export of Counterfeit Goods

China continues to be the world's leading source of counterfeit and pirated goods. For example, a 2022 report identified China and Hong Kong as the largest exporters of counterfeit foodstuffs and cosmetics, accounting for approximately 60% of counterfeit foodstuffs customs seizures and 83% of counterfeit cosmetics customs seizures.35 China and Hong Kong accounted for over 83% of the value measured by manufacturers' suggested retail price of counterfeit and pirated goods seized by U.S. Customs and Border Protection in Fiscal Year 2023.36 The failure to curb the widespread manufacture, domestic sale, and export of counterfeit goods affects not only right holders but also the health and safety of consumers. The production, distribution, and sale of counterfeit medicines, fertilizers, pesticides, and under-regulated pharmaceutical ingredients remain widespread in China.

Stakeholders continue to express concerns about the production, distribution, and sale of counterfeit medicines and unregulated active pharmaceutical ingredients (APIs), as well as about the Drug Administration Law and Criminal Law, which give local officials substantial discretion in allowing companies that import unapproved drugs to escape liability or face lighter penalties. Furthermore, as the top manufacturer and a leading exporter of pharmaceutical ingredients, China still lacks effective regulatory oversight. In particular, China does not regulate manufacturers that do not declare an intent to manufacture APIs for medicinal use. It also does not subject exports to regulatory review, enabling many bulk chemical manufacturers to produce and export APIs outside of regulatory controls. Furthermore, China lacks central coordination of enforcement against counterfeit

pharmaceutical products and ingredients, resulting in ineffective enforcement at the provincial level and with respect to online sales.

Availability of Counterfeit Goods Online, Online Piracy, and Other Issues

China's e-commerce markets, the largest in the world, remain a source of widespread counterfeits as infringing sales have migrated from physical to online markets. Right holders also raise concerns about the proliferation of counterfeit sales facilitated by the confluence of e-commerce platforms and social media in China. Right holders continue to report difficulties in receiving information and support from platforms in investigations to uncover the manufacturing and distribution channels of counterfeit goods and sellers, as well as onerous evidentiary requirements and excessive delays in takedowns. Counterfeiters continue to exploit the use of small parcels and minimal warehouse inventories, the separation of counterfeit labels and packaging from products prior to the final sale, and the high volume of packages shipped to the United States to escape enforcement and to minimize the deterrent effect of enforcement activities.

Widespread online piracy also remains a major concern, including in the form of "mini Video on Demand (VOD)" facilities that screen unauthorized audiovisual content, illicit streaming devices (ISDs), and unauthorized copies of or access codes to scientific journal articles and academic texts. As a leading source and exporter of systems that facilitate copyright piracy, China should take sustained action against websites and online platforms containing or facilitating access to unlicensed content, ISDs, and piracy apps that facilitate access to such websites.

There was no progress in 2023 on finalizing amendments to the E-Commerce Law, which were issued by SAMR for public comment in August 2021. The draft amendments to the E-Commerce Law include changes that would extend the deadline for right holders to respond to a counternotification of non-infringement, and impose penalties for fraudulent counter-notifications and penalties that restrict the business activities of platforms for serious circumstances of infringement. Although noting improvements under the draft amendments, right holders have raised concerns about the failure to codify the elimination of liability for erroneous notices submitted in good faith, as well as proposed changes that would allow reinstatement of listings upon posting a guarantee.

China's most recent version of its Foreign Investment Negative List, which entered into force in January 2022, continues to maintain prohibitions on foreign investment in online publishing and online audiovisual programming (with the exception of services under China's WTO accession commitments),

as well as radio and TV broadcasting, transmission, production, and operation. The List does not restrict foreign investment in online music services.

Also, right holders report significant obstacles to releasing content in China, including limited windows to submit content for review, a non-transparent content review system, and significantly slowed processing and licensing of content for online streaming platforms. Another challenge has been burdensome requirements for documentation of chain of title and ownership information. These barriers have severely limited the availability of foreign content, prevented the simultaneous release of foreign content in China and other markets, and created conditions for greater piracy. Right holders also report that a draft bill published in March 2021 could restrict participation of foreign companies in production, distribution, and broadcasting of radio and television programs, including when provided online. Also, China's extension of its content review system to cover books intended for distribution in other markets has imposed heavy burdens on foreign publishers.

Additionally, it is critical that China fully implement the terms of the 2012 United States-China Memorandum of Understanding (MOU) regarding the importation and distribution of theatrical films and abide by its commitment to negotiate further meaningful compensation that China owes the United States.

Copyright

Right holders continue to highlight the need for effective implementation and clarification of criminal liability for the manufacture, distribution, and exportation of circumvention devices, as well as new measures to address online piracy. Right holders also report continuing uncertainty about whether amendments to the Copyright Law in 2021 protect sports and other live broadcasts, and recommend clarification in the copyright regulations. While right holders welcomed some effective, but limited, enforcement actions, such as the 2023 Sword-Net Special Campaign that targeted unauthorized live broadcasts of sporting events and other online piracy of copyrighted content, they encourage China to develop these periodic campaigns into sustained, long-term enforcement measures.

Patent and Related Policies

Right holders raised concerns that, although the Patent Law allows the filing of supplemental data to support disclosure and patentability requirements, the rules for accepting post-filing data are opaque and patent examiners have applied an overly stringent standard to reject such data. Right holders

continue to express strong concerns about obstacles to patent enforcement, such as lengthy delays in courts, lack of preliminary injunctions, and undue emphasis on administrative enforcement.

Following the implementation of a mechanism for the early resolution of potential pharmaceutical patent disputes in 2021, right holders have expressed concerns about the lack of transparency in decisions issued by the China National Intellectual Property Administration (CNIPA), the cumbersome registration system, and the lack of any penalties for erroneous patent statements. Right holders continue to raise concerns that they had identified prior to implementation, such as regarding potential difficulties in obtaining preliminary injunctions, the length of the stay period, and the possibility of bias in favor of Chinese companies.

Obstacles to patent enforcement continue to include lengthy delays in the court system, the reported unwillingness of courts to issue preliminary injunctions, burdensome invalidity proceedings, onerous evidentiary requirements, and ambiguity about whether a patentee's right to exclude extends to manufacturing for export.

With respect to patent prosecution, right holders continue to express concerns about the lack of transparency and due process, including a lack of notice of third-party submissions or the opportunity to respond, despite the reliance of examiners on arguments from such submissions. Long-standing concerns also include a lack of harmonization between China's patent grace period and international practices.

China continues to impose unfair and discriminatory conditions on the effective protection against unfair commercial use, as well as unauthorized disclosure, of test or other data generated to obtain marketing approval for pharmaceutical products. The United States and China agreed to address this issue in future negotiations.

Stakeholders continue to express concern regarding the 2019 Human Genetic Resources Administrative Regulation and the 2020 Biosecurity Law, along with the Implementing Rules for the Regulations on the Management of Human Genetic Resources that entered into effect in May 2023. These measures mandate collaboration with a Chinese partner and shared ownership of patent rights arising out of any research generated by using human genetic resource materials in China. According to stakeholders, these measures create uncertainty about the type of research that would trigger the sharing of IP rights, a need for greater clarity on the requirements for approved IP arrangements, and the risk of forced or pressured technology transfer. These measures also impose non-transparent requirements for government approval before any transfer of data outside of China. Right holders

continue to raise concerns about the lack of transparency in government pricing and reimbursement processes for pharmaceutical products.

With respect to standards, China should establish standards-setting processes that are open to domestic and foreign participants on a non-discriminatory basis, eliminate unreasonable public disclosure obligations in standards-setting processes, and provide sufficient protections for standards-related copyrights and patent rights.

The issuance of anti-suit injunctions by Chinese courts in standard essential patent (SEP) disputes has not occurred in recent years, but the issue continues to raise due process and transparency concerns for right holders, including regarding how such rulings may favor domestic companies over foreign patent holders. Although some stakeholders have compared anti-suit injunctions in China to their use in other jurisdictions, right holders have raised concerns that Chinese courts appear to use the issuance of anti-suit injunctions in support of their attempts to assert jurisdiction over global SEP disputes. High-level political and judicial authorities in China have called for extending the jurisdiction of China's courts over global IP litigation and have cited the issuance of an anti-suit injunction as an example of the court "serving" the "overall work" of the Chinese Communist Party and the Chinese State.

In June 2022, the National People's Congress passed amendments to the Anti-Monopoly Law (AML), which entered into effect in August 2022. Right holders have raised concerns about the implementation of the amended AML, particularly regarding the draft implementing rules that define anti-competitive behavior in the development of standards and the licensing and implementation of SEPs. Right holders stated concerns that AML enforcement can be misused for the purpose of depressing the value of foreign-owned IP in key technologies, including by finding violations of the law with respect to the licensing of patents without actual harm to competition or the competitive process.

It is critical that China's AML enforcement be fair, transparent, and non-discriminatory; afford due process to parties; focus on whether there is harm to competition or the competitive process, consistent with the legitimate goals of competition law; and implement appropriate competition remedies to address the competitive harms. China should not use competition law to advance noncompetition goals when there is no harm to competition or the competitive process.

China's "Secure and Controllable" Policies

China continues to build on its policies for "secure and controllable" information and communications technology (ICT) products under the Cybersecurity Law (CSL) and the Cryptography Law. In 2022, the Cyberspace Administration of China issued final implementing measures for conducting cybersecurity reviews under the CSL. Right holders continue to raise concerns about the invocation of cybersecurity as a pretext to require disclosure of trade secrets and other types of IP and to restrict market access. Furthermore, encryption laws, which impose mandatory approval requirements with unclear exemptions, create an uncertain business environment for foreign companies.

U.S. right holders should not be forced to choose between protecting their IP against unwarranted disclosure and competing for sales in China. Going forward, China must not invoke security concerns in order to erect market access barriers, require the disclosure of critical IP, or discriminate against foreign-owned or -developed IP.

Developments, Including Progress and Actions Taken

Bad Faith Trademarks and Other Trademark Examination Issues

In 2023 and early 2024, China addressed some concerns regarding bad faith trademark applications, including by issuing a measure intended to provide more consistent and predictable application examination results, as well as providing a non-use ground for cancellation of a collective or certification mark in another measure. Also, in January 2023, CNIPA issued the 2023-2025 Work Plan for Systemically Governing Bad Faith Trademark Registration and Promoting High-quality Development, which established goals over the next three years for combating bad faith trademark registrations, including for enforcement actions against trademarks with significant adverse effects and obviously deceptive characteristics, bad faith preemptive registrations, trademark hoarding, and abuse of trademark rights, as well as for the regulation of trademark agencies aiding perpetrators of bad faith trademark registrations.

Despite these developments, bad faith trademarks remain one of the most significant challenges for U.S. brand owners in China. The United States continues to urge China to take further steps to address concerns, including adoption of an intent-to-use requirement for trademark applications.

In 2023, stakeholders raised concerns regarding reforms that appear primarily focused on increasing the speed rather than quality of trademark examinations. While CNIPA continues to tout downward trends in the average period for obtaining a trademark from the date of application to registration (currently less than 7 months), and the average time for appeals of trademark oppositions and

rejections has been cut to 11 months and 5.5 months, respectively, stakeholders continue to indicate that the quality of trademark examination is inconsistent across the board.

Stakeholders also continue to express other concerns relating to trademark examination, including regarding unnecessary constraints on examiners' ability to consider applications and marks across classes of goods and services, as well as the refusal to consider co-existence agreements and letters of consent during the trademark registration or process. They also noted that, in 2023, CNIPA's Trademark Office continued to erroneously refuse trademark applications on absolute grounds (such as lacking distinctiveness, being deceptive as to product quality or source, and being offensive to socialist morality), which are much more difficult to overcome on appeal and often lead to refusals in future applications for the same trademark. In addition to denying right holders the ability to register their legitimate trademarks, erroneous refusals on absolute grounds significantly impact business operations because, in such cases, the right holders must immediately cease use of the mark even if the product already has launched or face significant potential penalties by administrative enforcement officials. Right holders also continued to report in 2023 that CNIPA is rejecting defensive filings allowed under the Guidelines for Trademark Examination and Trial, denying brand owners a useful proactive tool to defend against bad faith filings.

Stakeholders continue to urge the adoption of reforms to address the difficulties faced by legitimate right holders in obtaining well-known trademark status. The United States urges China to address these concerns from right holders concerning the administration of trademarks.

Legislative, Administrative, and Judicial Developments

In 2023, the National People's Congress (NPC) and its Standing Committee issued no new or amended legislation directly addressing IP. China still has not addressed right holder concerns with respect to preliminary injunctive relief, evidence production, evidentiary requirements, establishment of actual damages, insufficient damage awards, burdensome thresholds for criminal enforcement, and lack of deterrent-level damages and penalties.

Right holders continue to raise concerns about their ability to meet consularization and notarization requirements for documents submitted to the Beijing Intellectual Property Court and in other IPrelated proceedings. As a positive step, the Convention of 5 October 1961 Abolishing the Requirement of Legalisation for Foreign Public Documents (Apostille Convention) entered into force with respect to China in November 2023. For certain documents from Contracting States of the Apostille Convention, China will reportedly replace its current system for consularization procedures

with a new authentication procedure based on Apostille certificates, which may reduce the authentication process from 20 working days to a few working days. In December 2023, the Beijing IP Court released Guidelines for Handling Supporting Documents Certifying the Subject Qualification in Foreign-related Cases, which seek to address concerns about documentation for U.S. right holders from only two U.S. states (California and Delaware).

The decrease in transparency and the potential for political intervention with the judicial system, as well as the emphasis on administrative enforcement, remain as critical concerns. A longstanding concern has been that Chinese courts publish only selected decisions rather than all preliminary injunctions and final decisions. Moreover, the number of verdicts uploaded online has drastically decreased in the past year, further hampering transparency and making it more difficult for right holders to determine how China protects and enforces foreign IP. In January 2024, the SPC admitted to the decrease in case publications and announced the launch of a National Court Judgments Database. Initial details shared in December 2023 indicated the database would not be available to the public, and the SPC has not clarified the extent to which case decisions will be accessible to the general public or foreign firms. Additional concerns include interventions in judicial proceedings by local government officials, party officials, and powerful local interests that undermine the authority of China's judiciary and rule of law. In January 2024, amendments to the Civil Procedure Law entered into effect that expanded the jurisdiction of Chinese courts in cases involving foreign parties. Chinese courts appear to be interested in exercising jurisdiction in cases involving complex technologies, such as SEPs. A judiciary truly independent from the Communist Party of China is critical to promote rule of law in China and to protect and enforce IP rights. Right holders also expressed concerns about the increased emphasis on administrative enforcement, as authorities often fail to provide right holders with information regarding the process or results of enforcement actions.

In 2023, China took additional steps to develop "social credit" systems for IP, inserting a new social credit provision in the draft Trademark Law. CNIPA issued Provisions on Intellectual Property Rights Credit Management in January 2022 to expand the scope of conduct that will result in social credit penalties, such as addition to a blacklist and potential joint punishment by a wide range of agencies. A March 2022 document issued by the Central Committee of the Communist Party of China and the State Council emphasized the expansion of the social credit system to IP. In July 2022, CNIPA identified the first confirmed use of social credit penalties in IP, as punishment for an instance of willful patent infringement. These measures lack critical procedural safeguards, such as sufficient notice to the entity targeted for punishment, clear factors for determinations, and opportunities for appeal. The United States continues to object to any use of the "social credit system," including in the field of IP.

Patent and Related Developments

In December 2023, CNIPA issued new Implementing Regulations of the Patent Law, which entered into force on January 20, 2024. CNIPA also issued supporting documents, such as amended Patent Examination Guidelines. Right holders continue to express concern about the implementation of patent term extensions for unreasonable marketing approval delays, including limits on the type of protection provided.

The large quantities of poor-quality patents that are granted continue to be a concern. Although CNIPA announced in January 2021 the elimination of patent subsidies by 2025, local incentivization mechanisms continue to include subsidies for patent licensing, validity disputes, and litigation that can potentially distort the commercial market for patents.

SAMR issued the amended Provisions Prohibiting Intellectual Property Abuse to Preclude or Restrict Competition, which took effect in August 2023 and included new provisions on SEPs. SAMR also issued draft Anti-Monopoly Guidelines in the Field of Standard Essential Patents in June 2023. In December 2023, the SPC overturned the decision of a local intermediate court that had found that certain patents of a foreign company to be an "essential facility" and that the company's failure to license this IP to Chinese plaintiffs to be an abuse of dominance. Despite this positive development at the SPC, stakeholder concerns remain about the potential misuse of AML enforcement.

Industrial Designs

In 2022, China acceded to the Hague Agreement Concerning the International Registration of Industrial Designs. As a positive development, the Implementing Regulations of the Patent Law, issued in December 2023, clarified the connection between international design application procedures and domestic procedures. Also, in January 2023, CNIPA issued interim measures to provide guidance on procedural issues for design applications to replace the previous April 2022 interim measures.

Geographical Indications

In January 2024, China finalized the Measures for Protection of Geographical Indication Products. The new measures fail to require the identification of individual components of multicomponent terms that are being considered for GI protection when GI applications that contain multi-component terms are published for opposition. Without this information, interested parties may assume that all individual components of multi-component terms in an application for GI protection will also be protected as GIs,

which imposes onerous burdens on parties seeking to oppose such applications. In addition, right holders continue to raise concerns about certain trademark examination cases that involve the use of common names (generic terms). It is critical that China ensure full transparency and due process with respect to the protection of GIs, including safeguards for common names, respect for prior trademark rights, clear procedures to allow for opposition and cancellation, and fair market access for U.S. exports to China that rely on trademarks or the use of common names.

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EXHIBIT 166

China Official Walks Back Xi's Assurance to Biden

Published Nov 23, 2023 at 5:00 AM EST

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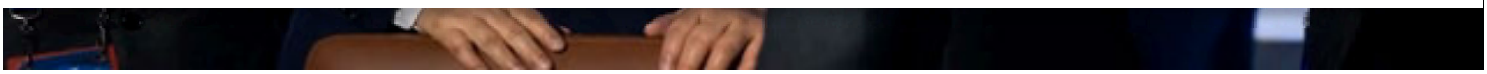

By Aadil Brar
China News Reporter

FOLLOW

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A Chinese official has played down a reported assurance by President Xi Jinping to U.S. President Joe Biden that China has no plans to invade Taiwan.

Xi was reported by the Associated Press as having told Biden during a meeting in San Francisco on November 15 that he had no plans to invade Taiwan. The report cited a U.S. official speaking on condition of anonymity, and the assurance was not confirmed by Chinese sources.

China has never ruled out the threat of invading Taiwan, which it considers part of its territory despite its rejection by the self-governing island. But Beijing has also long emphasized prioritizing peaceful "re-unification" rather than war.

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Tensions are growing across the Taiwan Strait ahead of Taiwan's 2024 election, particularly given that the candidates of the ruling Democratic Progressive Party (DPP) are both prominent China skeptics.

Chen Binhua, the spokesperson for the Taiwan Affairs Office of the State Council, China's national cabinet, accused DPP candidate Lai Ching-te and others of taking Xi's reported comments out of context and hyping them in a way that downplayed the danger of "Taiwan independence" activities by saying that the mainland "has no plans to attack

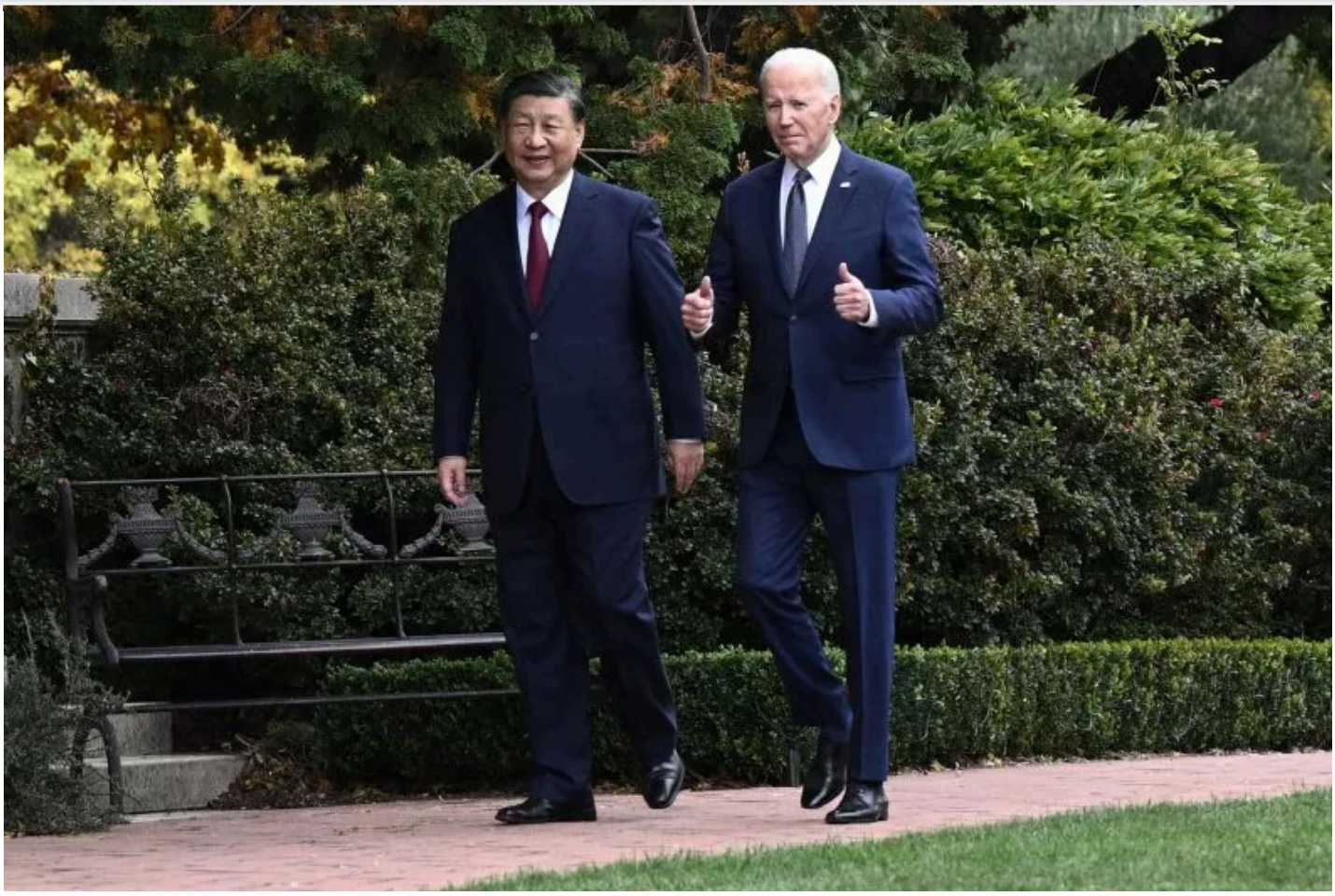
Party during campaigning in Taiwan's Yunlin County.

"The Kuomintang has continued to spread rumors during this election, saying that "if you vote for the DPP, young people will go to the battlefield" and that 2024 will be an election of war and peace. So Xi Jinping's words have proven that the Kuomintang is telling election lies," Lai had said.

No Change

Chen underlined that China's position on Taiwan had not changed.

"Lai has taken the content related to the Taiwan question out of context and maliciously hyped it," the *Global Times* quoted Chen as saying.



US President Joe Biden (R) and Chinese President Xi Jinping walk together after a meeting during the Asia-Pacific Economic Cooperation (APEC) Leaders' week on November 15, 2023. A Chinese official played down reported assurances by... More **PHOTO BY BRENDAN SMIALOWSKI/AFP VIA GETTY IMAGES**

Lai, a self-described "pragmatic Taiwan independence worker," has strategically avoided advocating for formal statehood for the island, a move that could provoke conflict across the Taiwan Strait. He did not immediately respond to a *Newsweek* request for comment on Chen's statement.

Lai's running mate, Hsiao Bi-Khim, expressed the hope that Xi's statements that no invasion was planned were sincere but emphasized the need for caution, using the phrase "trust, but verify", Taiwan's official Central News Agency reported.

According to the Associated Press, Biden chided China for its major military build-up

to Taiwan to honor its commitment not to support Taiwan's independence and to support its reunification with the mainland.

"China will realize reunification, and this is unstoppable," he said, according to the foreign ministry readout.

About the writer

Aadil Brar

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Aadil Brar is a reporter for Newsweek based in Taipei, Taiwan. He covers international security, U.S.-China relations, and East Asian ... read more

EXHIBIT 167

September 2022

The Opioid Crisis and Recent Federal Policy Responses

At a Glance

The United States has been experiencing an opioid crisis since the mid-1990s, and opioids have had a significant effect on public health and on the nation's economic and social outcomes. In this report, the Congressional Budget Office examines the consequences and timeline of the crisis, the contributing factors and federal responses to it, and the effects of the coronavirus pandemic on the crisis.

- **Deaths.** More than 500,000 opioid-involved deaths have occurred since 2000, and the United States has the world's highest number of opioid-involved deaths per capita. Although federal funding to address the opioid crisis has increased in recent years, opioid overdose mortality has increased as well. Deaths from opioid-involved overdoses were among the leading causes of death in 2020.

- **Health and Other Effects.** The use and misuse of opioids can result in serious health effects: People with certain harmful behaviors that result from opioid misuse—such as an increase in the amount and frequency of opioid use or failure to fulfill major responsibilities at work, home, or school—have opioid use disorder (OUD), which can affect people's participation in the labor force and their ability to care for their children. Treatment for OUD is used far less than behavioral health professionals recommend.

- **Changes Over Time.** The opioid crisis has occurred in waves distinguished by the different types of opioids involved in overdose deaths and the use of opioids in combination with other drugs.

- **Contributing Factors.** A rise in opioid prescribing, changes in illegal opioid markets, and greater demand for opioids due to worsening economic and social conditions for certain populations are key contributors to the crisis.

- **Federal Laws.** Between 2016 and 2018, three laws enacted in response to the crisis aimed to lower the demand for and supply of opioids and to reduce their harm. The funding in those laws

complemented annual appropriations to agencies tasked with responding to substance use disorder, including opioid use disorder.

Notes

Summary

The opioid crisis emerged in the United States in the mid-1990s and has continued in a series of overlapping waves. In this report, the Congressional Budget Office describes the effects and evolution of the crisis, the factors that have contributed to it, the laws enacted to address it, and the effects of the coronavirus pandemic on the crisis.

- **The Crisis After the Enactment of the Laws and During the Pandemic.** Opioid-involved deaths continued to increase after the laws were enacted—initially more slowly than in preceding years but then more rapidly during the pandemic. Opioid misuse increased during the pandemic as people experienced worsened mental health, more social isolation, greater job losses, and reduced access to treatment. In addition, the use of more potent synthetic opioids led to a sharp increase in overdose deaths. The pandemic and other factors have made it difficult to isolate the effect of the laws on the opioid crisis.

What Are Opioids, and What Is Opioid Use Disorder?

Opioids are a class of drugs that includes prescription pain relievers. Although those prescription drugs are available legally and have valid clinical applications, they can be used nonmedically and distributed illegally. Other opioids, such as heroin, are produced illegally. Fentanyl can be produced legally and illegally. The misuse of opioids can lead to serious side effects and death.

People with certain harmful behaviors that result from opioid misuse—such as an increase in the amount and frequency of opioid use or failure to fulfill major responsibilities at work, home, or school—have opioid use disorder (OUD). Several treatments are available for people with OUD, including medications and psychosocial therapy, but research indicates that those treatments are underused.[1] The drug naloxone can reverse opioid overdoses.

What Are the Effects of the Opioid Crisis?

The opioid crisis has had profound effects. In the United States, more than 500,000 people have died from opioid-involved overdoses since 2000. Deaths from opioid-involved overdoses were particularly numerous during the pandemic, placing them among the leading causes of death in 2020. Those deaths have contributed to the decline in life expectancy that the United States has experienced since 2014. The opioid crisis has also increased the incidence of related diseases. The injection of opioids has contributed to the

wider spread of hepatitis C and HIV, and the number of newborns experiencing withdrawal as a result of their mothers' opioid misuse has also increased.

The opioid crisis has affected spending and revenues in the federal budget. Federal spending on health care, the child welfare system, means-tested social programs, and efforts to reduce drug trafficking has increased. However, opioid-involved deaths have reduced federal spending on benefits, such as Medicare and Social Security, that people who died would have received in the future. Tax revenues have also decreased because of lost earnings from reduced longevity and from the decreased productivity of people who misuse opioids.[2]

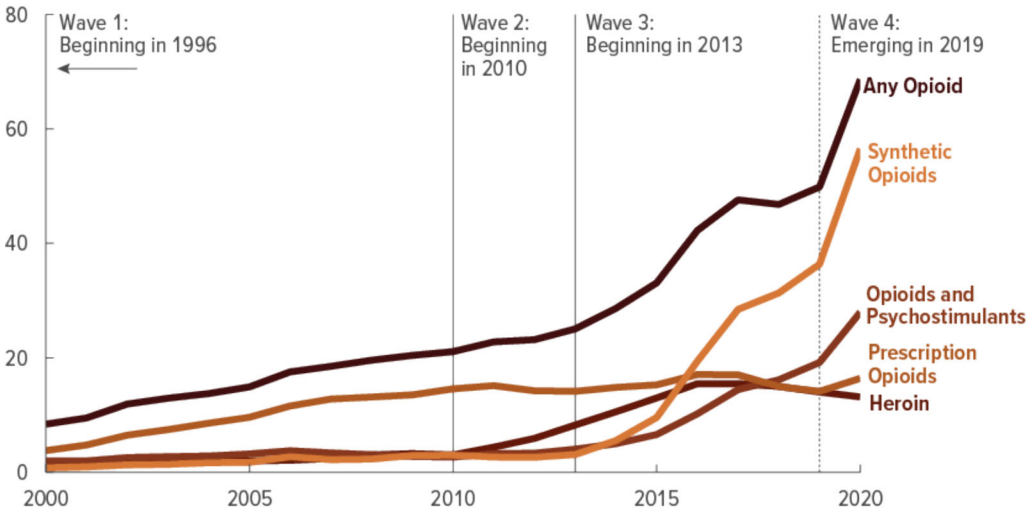
How Has the Crisis Evolved?

The opioid crisis has occurred in overlapping waves (see Figure S-1). The first wave began in 1996 with the expanded use of prescription opioids to address chronic pain, nonmedical use of prescription opioids, and distribution of those drugs through illegal means, such as sharing or selling pills to people who do not have a prescription for them. Use of illegally manufactured opioids increased during the second and third waves of the crisis. The second wave began in 2010 with the increased use of heroin, and the third wave started in 2013 as fentanyl use increased. A fourth wave of the crisis seems to be emerging, one characterized by the use of illegally manufactured opioids in combination with psychostimulants such as cocaine and methamphetamine.

Figure S-1.

Overdose Deaths Involving Opioids, by Type of Opioid

Thousands of Deaths



Opioid-involved deaths have increased as the substances used have become more potent.

Notes ▾

Although people from all income levels, regions of the country, and backgrounds use and misuse opioids, the opioid crisis has affected demographic groups in different ways. For example, non-Hispanic White people had the highest opioid-involved death rate during the first wave of the crisis. During the third wave, however, deaths per 100,000 people among non-Hispanic Black and Native American or Alaska Native people caught up to and then surpassed the death rate among non-Hispanic White people in 2020.

What Factors Have Contributed to the Crisis?

Several factors have contributed to the opioid crisis: an increase in the prescribing of opioids, changes in illegal opioid markets, and greater demand for opioids among people in some demographic groups that have experienced declines in real wages and social cohesion. Those factors have reinforced each other.

Opioid prescribing increased as a result of aggressive promotion efforts by pharmaceutical companies. Clinical norms also began to emphasize assessing patients' pain and treating it with prescription opioids. In addition,

oversight and reimbursement incentives in the health care system encouraged opioid prescribing.

Changes in illegal opioid markets have affected the crisis. At first, the excess supply of prescription opioids facilitated their nonmedical use and illegal distribution. More recently, demand for heroin and fentanyl has increased as their prices have fallen and as the availability of prescription opioids has declined. The price of fentanyl is relatively low because it is produced in a lab, and its high potency allows it to be transported in small quantities that are difficult to detect. Most illicitly produced fentanyl is made in Mexico from precursor chemicals manufactured in China.

Lastly, although the connection between socioeconomic factors and opioid use is not fully understood, evidence suggests that opioid demand increased among people who experienced declining real wages and social circumstances, including non-Hispanic White people without a college education.

What Federal Laws Have Been Enacted in Response to the Crisis?

Between 2016 and 2018, three laws were enacted in response to the opioid crisis:

- The Comprehensive Addiction and Recovery Act (CARA) of 2016 (Public Law 114-198, July 2016),
- The 21st Century Cures Act (P.L. 114-255, December 2016), and
- The Substance Use-Disorder Prevention that Promotes Opioid Recovery and Treatment (SUPPORT) for Patients and Communities Act (P.L. 115-271, October 2018).

Provisions in the laws address the multifaceted aspect of the crisis with strategies aimed to reduce demand, supply, and harm.

To reduce the demand for opioids, the laws lower barriers to treatment, for example, by requiring state Medicaid programs to temporarily cover all medications approved by the Food and Drug Administration (FDA) for the

treatment of OUD. Similarly, a temporary state plan option allows federal matching funds to be used for services provided to beneficiaries with substance use disorder (SUD) in institutions for mental diseases, which are facilities with more than 16 beds that primarily diagnose, treat, and care for people with mental diseases, including SUD. Two provisions add new Medicare coverage for opioid treatment programs and telehealth services for the treatment of SUD. In addition, certain provisions in the laws aim to limit the supply of opioids by increasing Medicare's oversight of prescription drug utilization and authorizing partial refills to reduce the availability of unused prescription opioids. Finally, the laws authorized appropriations for grants to reduce harm by expanding the use of naloxone.

Provisions in the laws resulted in changes in mandatory outlays and authorizations of appropriations.[3] Whereas provisions aimed at reducing the demand for opioids were estimated to increase mandatory outlays, provisions aimed at reducing the supply of opioids were estimated to increase spending in some cases and reduce spending in other cases. On net, CBO estimated that provisions in CARA would *reduce* mandatory outlays by $187 million over the 2017–2026 period and that provisions in the SUPPORT for Patients and Communities Act would *increase* mandatory outlays by $2.7 billion over the 2019–2028 period, mostly for Medicaid.[4] Although most provisions affecting mandatory spending are permanent, a few are temporary and are set to expire in the next few years.[5]

Also, collectively, the three laws authorized additional appropriations of about $700 million to $1.6 billion per year between fiscal years 2017 and 2023; those funds would be available only if provided in subsequent discretionary appropriation acts.[6] Quantifying the amount of authorized funding that was actually appropriated is challenging because appropriation acts do not always clearly identify the legislation authorizing the funding, and they may fund multiple programs at once, or not at all. According to one estimate, total federal appropriations to address the opioid crisis almost tripled—rising from $2.1 billion to $6.1 billion—between fiscal years 2017 and 2020.[7]

How Has the Crisis Evolved After Enactment of the Laws and During the Pandemic?

Prescription opioid use continued to fall after the three laws were enacted. Opioid-involved deaths increased in most subsequent years before the start of the pandemic, but the annual rate of increase in deaths slowed.

Deaths involving opioids increased dramatically during the pandemic, driven by a sharp increase in fatalities involving fentanyl. The rise in opioid-involved deaths may be due to greater demand, as well as to the availability of more potent opioids and an increase in the solitary use of opioids. Policy responses to the pandemic affected the opioid crisis in several ways. In March 2020, certain barriers to OUD treatment were reduced, and the American Rescue Plan Act of 2021 appropriated funds to address the opioid crisis.

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1. Psychosocial therapy involves working with behavioral health providers to develop the skills to adjust to and interact in social situations that might pose challenges. For more information on the underutilization of treatment, see Ryan Mutter, Donna Spencer, and Jeffrey McPheeters, "Factors Associated With Initial Treatment Choice, Engagement, and Discontinuation for Patients With Opioid Use Disorder," *Psychiatric Services*, vol. 73, no. 6 (June 2022), pp. 604–612, https://doi.org/10.1176/appi.ps.202100239 (https://doi.org/10.1176/appi.ps.202100239); and Li-Tzy Wu, He Zhu, and Marvin S. Swartz, "Treatment Utilization Among Persons With Opioid Use Disorder in the United States," *Drug and Alcohol Dependence*, vol. 169 (December 2016), pp. 117–127, https://doi.org/10.1016/j.drugalcdep.2016.10.015 (https://doi.org/10.1016/j.drugalcdep.2016.10.015).

2. CBO's cost estimates generally reflect the assumption that the overall output of the economy would not change as a result of the legislation. Therefore, when estimating the effects of policies related to opioids, the agency does not typically include such effects.

3. When identifying changes in mandatory spending and authorized amounts related to opioids, CBO included provisions related to SUD more generally because the laws primarily focused on the opioid crisis. As a result,

the amount of funds ultimately used for addressing the opioid crisis may be overestimated.

4. Mandatory, or direct, spending includes outlays for some federal benefit programs and for certain other payments to people, businesses, nonprofit institutions, and state and local governments. Such outlays are generally governed by statutory criteria and are not normally constrained by the annual appropriation process. See Congressional Budget Office, cost estimate for Draft Conference Agreement for S. 524, the Comprehensive Addiction and Recovery Act of 2016 (July 5, 2016), www.cbo.gov/publication/51765 (http://www.cbo.gov/publication/51765), and cost estimate for H.R. 6, the Substance Use-Disorder Prevention that Promotes Opioid Recovery and Treatment (SUPPORT) for Patients and Communities Act (September 27, 2018), www.cbo.gov/publication/54515 (http://www.cbo.gov/publication/54515). Those cost estimates include the budgetary effects of provisions unrelated to opioid use disorder, in addition to provisions related to opioid use disorder (and substance use disorder more generally). In this report, CBO focuses on provisions that were estimated to increase or decrease mandatory spending by more than $500,000.

5. A provision allowing federal matching funds for services in institutions for mental diseases expires at the end of fiscal year 2023, and a provision requiring state Medicaid programs to cover all FDA-approved medications for OUD expires at the end of fiscal year 2025.

6. Amounts authorized to be appropriated for the 21st Century Cures Act are based on CBO's cost estimate available at www.cbo.gov/publication/52301 (http://www.cbo.gov/publication/52301). Because CBO's cost estimates for CARA and the SUPPORT for Patients and Communities Act did not include changes in spending subject to appropriation, in this report the agency examined the text of the laws as enacted. For all three laws, CBO summed authorizations subject to appropriation related to opioids or substance use disorder with two exceptions. First, to focus on new activities related to opioids, CBO excluded authorizations of appropriations for programs in existence before the three laws were enacted. Second, the agency excluded authorizations of appropriations for programs that aim to address trauma in children in contact with adults with SUD because those programs address secondary effects, rather than direct effects, of the opioid crisis.

7. Michele Gilbert and others, *Combating the Opioid Crisis: Smarter Spending to Enhance the Federal Response* (Bipartisan Policy Center, April 2022), Figure 10, https://tinyurl.com/93dcwb7w (https://tinyurl.com/93dcwb7w). By comparison, lawmakers appropriated about $1.8 billion in 2015 and again in 2016—just before the three laws were enacted—for the Substance Abuse Prevention and Treatment Block Grant program, the largest grant program of the Substance Abuse and Mental Health Services Administration (SAMHSA) aimed at preventing and treating substance abuse. See Erin Bagalman, *SAMHSA FY2017 Budget Request and Funding History: A Fact Sheet*, Report for Congress R44375, version 2 (Congressional Research Service, February 11, 2016), p. 3, https://tinyurl.com/yc7s4u76 (https://tinyurl.com/yc7s4u76).

Chapter 1

The Opioid Crisis

The ongoing opioid crisis in the United States has evolved over more than two decades.[1] The use and misuse of opioids can result in serious side effects, including death, and can have negative effects throughout society. Consequently, the crisis has affected the federal budget in various ways.

The opioid crisis has occurred in overlapping waves, which correspond to the different drugs prevalent at different times.[2] Prescription opioid use rose during the first wave of the crisis and fell during subsequent waves, as people increasingly used illegally produced opioids. The number of overdose deaths has increased over most years of the crisis, but it has affected racial and ethnic groups in different ways. Opioid-involved mortality was initially highest among non-Hispanic White people, but it has surged among other racial and ethnic groups as the use of more potent, illegally manufactured opioids has increased. The crisis has also affected people with other sociodemographic and economic characteristics in different ways.

Opioids and Opioid Use Disorder

Opioids are a class of drugs used to treat pain. They include legally and illegally produced and distributed substances. Legally produced opioids include prescription pain relievers that can also be used nonmedically and distributed illegally. Fentanyl, which is many times more powerful than morphine, can be produced legally and is available in prescription form as a patch to treat severe pain. Fentanyl and its analogues are also produced and distributed illegally. Heroin is an illegal opioid with no accepted medical use in the United States.

Serious side effects can result from the use and misuse of opioids. A person who overdoses on opioids can stop breathing and die. Use of opioids can lead to dependence (when a person who stops taking a drug experiences withdrawal symptoms) and tolerance (when a person needs to take more of a drug to experience the same amount of pain relief or "high").[3] People who use opioids may experience euphoria, constipation, and increased sensitivity to pain. When people who use opioids experience clinically significant impairment or distress—such as increasing the amount and frequency of opioid use or failing to fulfill major responsibilities at work, home, or school as a result of opioid misuse—they can be diagnosed with opioid use disorder.[4]

Most people who take prescription opioids for pain do not develop OUD, but about 8 percent to 12 percent of patients who take prescription opioids for chronic pain (a longer course of treatment than that for acute pain) develop OUD.[5] Risk factors for OUD include past or current misuse of substances, untreated psychiatric conditions, social or family connections that encourage misuse of substances, and post-9/11 combat deployment.[6]

Treatments for OUD have been shown to be effective at reducing the risks of overdosing, illegally using opioids, contracting hepatitis C and HIV, and engaging in criminal activity, as well as other outcomes.[7] Several treatments are available. Medications for OUD that have been approved by the Food and Drug Administration include methadone, buprenorphine, and naltrexone. OUD can also be treated with psychosocial therapy in conjunction with

medications. The Centers for Disease Control and Prevention (CDC) recommends that patients with OUD be offered treatment with medications in conjunction with psychosocial therapy.[8]

Treatment for OUD is underused, however: In 2019, less than one-third of the 1.7 million people with OUD reported receiving any treatment for substance use in the previous year.[9] Barriers to receiving treatment include affordability, lack of access, and stigma associated with OUD.[10]

Another drug, naloxone, can reverse opioid overdoses. It can be administered by health care providers as well as people without medical training.[11] Although naloxone prevents immediate adverse outcomes, it does not treat the underlying OUD.

Effects of the Opioid Crisis

The opioid crisis has had a significant effect on public health and on economic and social outcomes in the United States: More than 500,000 opioid-involved deaths have occurred since 2000.[12] The United States has the world's highest number of opioid-involved deaths per capita—more than five times the median for member countries of the Organisation for Economic Co-operation and Development.[13] More U.S. residents have died from opioid overdoses than were killed during World War II.

In 2020, there were 68,630 deaths involving opioids.[14] That number is smaller than those for the first three leading causes of death—heart disease (696,962), cancer (602,350), and COVID-19 (350,831)—but it is larger than those for some of the other top-10 causes of death, including influenza and pneumonia (53,544 deaths) and nephritis, nephrotic syndrome, and nephrosis (52,547 deaths).[15]

The number of opioid-involved overdose deaths in the United States has been particularly high among people ages 24 to 35, and many years of life have been lost as a result of those premature deaths.[16] Research has shown that opioid overdose deaths have contributed to the decline in U.S. life

expectancy that began after 2014.[17] The opioid crisis has also had a profound negative effect on families. For example, parents with OUD may be unable to care for their children.[18]

Along with the deaths caused by opioid-involved overdoses, the use of opioids has led to a corresponding increase in certain medical conditions. The injection of opioids has increased the spread of hepatitis C and HIV through contaminated needles.[19] Moreover, the use and misuse of opioids by people who are pregnant has resulted in a rise in neonatal abstinence syndrome.[20] (Neonatal abstinence syndrome refers to a group of conditions that occur when a baby withdraws from certain drugs, including opioids, after being exposed to them before birth.)

Opioids have affected participation in the labor force. Although prescription opioids have made it possible for some people with pain to work, the side effects of prescription opioids and the misuse of opioids have also kept people from working. Research indicates that the net effect of opioids has been to lower labor force participation.[21]

The opioid crisis has affected the federal budget by affecting spending and revenues, although the exact size of the effect is unknown.[22] Federal spending has increased because federally subsidized health insurance—including Medicare, Medicaid, and private health insurance obtained from employers or purchased through the marketplaces—has funded prescription opioids, treatment of patients with OUD, and overdose reversal drugs, for example.[23] The opioid crisis also has increased federal spending on the child welfare system and means-tested social programs, including cash assistance and disability programs.[24] In addition, the federal government has funded programs to combat the illegal trafficking of opioids and has prosecuted and incarcerated people engaged in opioid-related crimes.[25]

Moreover, federal tax revenues may have decreased because of the reduced productivity and lower wages of people with OUD, as well as the lost wages of people who die from opioid-involved overdoses.[26] (Those effects are typically not incorporated in the Congressional Budget Office's cost

estimates for legislation related to the opioid crisis, which reflect the standard assumption that the overall output of the economy does not change.)

Some of the consequences of the opioid crisis reduce budget deficits: Deaths from opioids among older people have reduced federal spending on programs such as Medicare and Social Security, and such spending will be reduced in the future because of deaths among young people.

Waves of the Opioid Crisis

The opioid crisis began in the mid-1990s and has proceeded in several overlapping waves characterized by increases in overdose deaths associated with changes in the drugs used (see Figure S-1). In the years leading up to the first wave of the opioid crisis, prescription opioids were usually prescribed sparingly, and their use was generally restricted to relieving acute pain from injury, surgery, cancer, or terminal illness.[27] At that time, physicians were cautious about prescribing opioids because of the associated risks, which had been observed in previous periods when opium, morphine, and heroin use had increased.[28]

The first wave of the opioid crisis began in 1996 with the expanded use of prescription opioids, particularly OxyContin.[29] Opioids were increasingly prescribed for chronic conditions such as low back pain, despite an absence of evidence about the long-term effectiveness of opioids for chronic pain.[30] During the first wave, prescription opioids were also increasingly used nonmedically and were distributed through illegal means. Nonmedical uses of prescription opioids include taking more of the product than is directed by a medical provider or crushing and injecting tablets that are meant to be swallowed. Illegal distribution of prescription opioids can occur through diversion of prescribed medications to others without a prescription. It also includes sales by drug dealers and “pill mills,” through which clinicians, clinics, or pharmacies distribute prescription drugs inappropriately.[31]

The second and third waves of the opioid crisis involved the use of several illicitly manufactured substances. The second wave of the opioid crisis began in 2010 with increased use of heroin, an illicitly produced

semisynthetic opioid derived from opium poppies. The third wave, which began in 2013, was characterized by increased use of fentanyl and related substances. Fentanyl is a completely synthetic drug made from ingredients in a lab.

Some experts have identified an emerging fourth wave of the crisis, one characterized by the use of illegally manufactured opioids in combination with psychostimulants such as cocaine and methamphetamine.[32] People may intentionally use illicitly manufactured opioids and psychostimulants at the same time to enhance the high from opioids or compensate for the undesirable effects of opioids.[33] Users may also unknowingly take illicitly manufactured opioids and psychostimulants because they were combined by drug dealers and others supplying the substances.[34] In September 2021, the Drug Enforcement Administration (DEA) issued a public safety alert about the increase in counterfeit prescription pills that contain fentanyl and methamphetamine.[35]

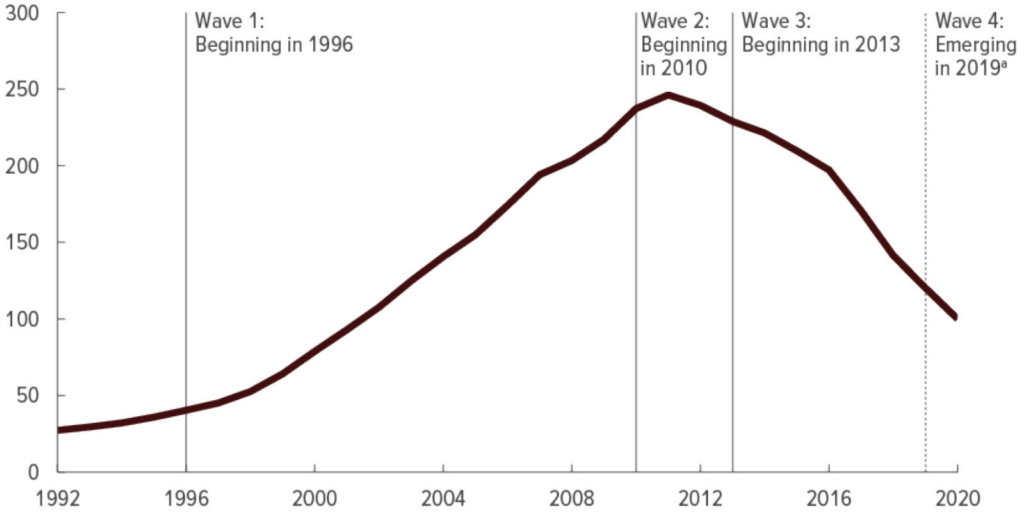
Trends in the Use of Prescription Opioids

The use of prescription opioids, commonly measured by morphine milligram equivalents (MMEs) dispensed, increased from 27 billion MMEs in 1992 to 246 billion MMEs in 2011 and has decreased since then. An estimated 100 billion MMEs were dispensed in 2020 (see Figure 1-1). The declines in opioid prescribing, measured in MMEs per capita, were largest in states that had previously had the highest rates of opioid prescribing. From 2018 to 2019, every state experienced a decline in MMEs per capita.[36] (At the same time, however, the use of illicitly produced opioids increased substantially.)[37]

Figure 1-1.

Prescription Opioids Dispensed

Billions of Morphine Milligram Equivalents Dispensed



The amount of prescription opioids dispensed increased during the first wave of the opioid crisis and peaked in 2011. It decreased during subsequent waves as use of illicitly produced opioids increased.

Notes ▼

Even with the decline in the volume of opioid prescriptions dispensed, the United States remains the world's largest consumer of prescription opioids. The amount of prescription opioids dispensed per million people per day in the United States is approximately four times the median for member countries of the Organisation for Economic Co-operation and Development.[38]

Opioid-Involved Overdose Deaths During the Waves of the Crisis

The number of opioid-involved overdose deaths per year increased substantially between 2000 and 2020, but the types of opioids involved in those deaths have changed during the waves of the crisis. (Some deaths involved more than one type of opioid.) Increases in deaths involving prescription opioids drove the rise in opioid overdose mortality in the early 2000s. Since 2010, the annual number of deaths involving prescription opioids has remained relatively steady. The number of deaths involving heroin increased after 2010 and leveled off in 2016. Opioid overdose deaths involving synthetic opioids (other than methadone) increased dramatically after 2013. Synthetic opioids include a variety of substances, but many of the deaths involve illegally produced fentanyl and related substances.[39] Deaths

involving the combined use of opioids and psychostimulants have surged in recent years: More than five times as many people died from the combined use of those drugs in 2020 as in 2014.

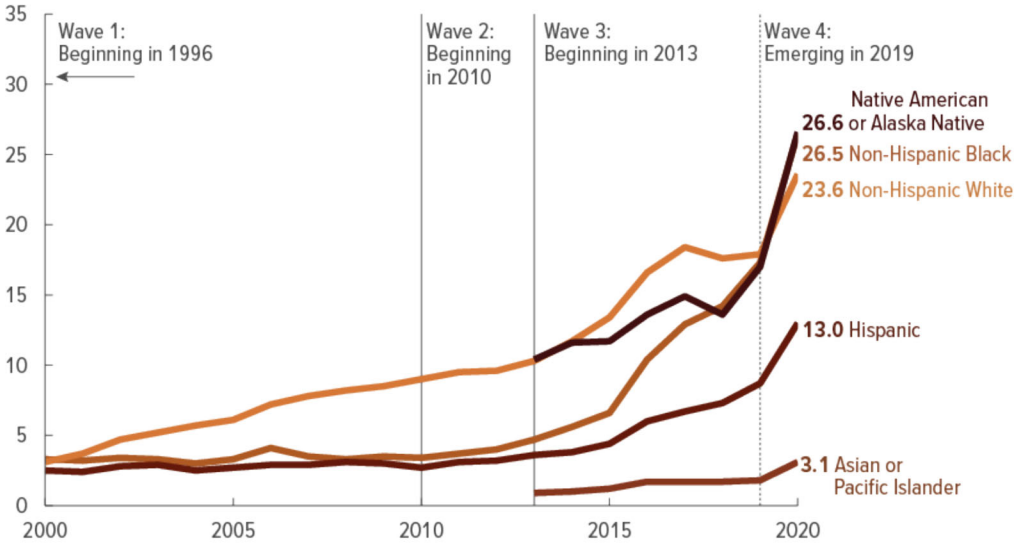
Effects of the Crisis on Subpopulations

Although people of all backgrounds use and misuse opioids, opioid-involved deaths have affected demographic groups in different ways. More deaths per 100,000 people occurred among non-Hispanic White people during the first wave of the crisis than among people in other racial and ethnic groups (see Figure 1-2). Opioid-involved mortality was more connected to use of prescription opioids during the first wave of the crisis, and non-Hispanic White people may have had greater access to those drugs because they were more likely to be prescribed opioids.[40]

Figure 1-2.

Overdose Deaths Involving Opioids, by Race and Ethnicity

Deaths per 100,000 People



The number of opioid-involved deaths per capita for non-Hispanic White people grew during the first two waves of the crisis. As the use of more potent synthetic opioids increased, the number of deaths also rose among people from other racial and ethnic groups.

Notes ▾

Opioid-involved deaths among racial and ethnic groups other than non-Hispanic White people and Asian or Pacific Islanders increased dramatically with the greater use of illegally produced opioids starting in the third wave of the opioid crisis. The number of deaths per 100,000 people among Native American or Alaska Native and non-Hispanic Black people caught up to the number of deaths among non-Hispanic White people in 2019 (the beginning of the emerging fourth wave of the crisis) and exceeded it in 2020. Opioid-involved overdose deaths have also increased over time among Hispanic people and Asian or Pacific Islanders, though much less than for other groups. Deaths among those two groups rose sharply in 2020, as they did for other racial and ethnic groups. The increase in deaths involving opioids and stimulants among racial and ethnic groups may be due to disparities in access to treatment and differences in the provision of treatment.[41]

The effects of the opioid crisis also differed by various other sociodemographic and economic characteristics. In an analysis of data from 2008 to 2015, researchers found that opioid-involved mortality was higher among individuals who were male, were ages 18 to 59, were disabled, had less education, had criminal justice involvement, or lived in the South Atlantic or Mountain states. More deaths involving opioids also occurred among people who were unemployed, who had low income, and who did not have health insurance.[42]

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1. National Institute on Drug Abuse, “Overdose Death Rates” (January 20, 2022), https://tinyurl.com/cmr53zkp (https://tinyurl.com/cmr53zkp).
2. Nora D. Volkow and Carlos Blanco, “The Changing Opioid Crisis: Development, Challenges, and Opportunities,” *Molecular Psychiatry*, vol. 26 (January 2021), pp. 218–233, https://doi.org/10.1038/s41380-020-0661-4 (https://doi.org/10.1038/s41380-020-0661-4).
3. Centers for Disease Control and Prevention, “Prescription Opioids” (August 29, 2017), www.cdc.gov/drugoverdose/opioids/prescribed.html (https://www.cdc.gov/drugoverdose/opioids/prescribed.html).
4. For more information on the diagnostic criteria for OUD, see Sarah A. Palumbo and others, “Assessment of Probable Opioid Use Disorder Using Electronic Health Record Documentation,” *JAMA Network Open,* vol. 3, no. 9

(September 2020), https://doi.org/10.1001/jamanetworkopen.2020.15909 (https://doi.org/10.1001/jamanetworkopen.2020.15909).

5. Kevin E. Vowles and others, "Rates of Opioid Misuse, Abuse, and Addiction in Chronic Pain: A Systematic Review and Data Synthesis," *Pain*, vol. 156, no. 4 (April 2015), pp. 569–576, https://doi.org/10.1097/01.j.pain.0000460357.01998.f1. (https://doi.org/10.1097/01.j.pain.0000460357.01998.f1)

6. Resul Cesur, Joseph J. Sabia, and W. David Bradford, *Did the War on Terror Ignite an Opioid Epidemic?* Working Paper 26264 (National Bureau of Economic Research, September 2019), www.nber.org/papers/w26264 (http://www.nber.org/papers/w26264); and Lynn R. Webster, "Risk Factors for Opioid-Use Disorder and Overdose," *Anesthesia and Analgesia*, vol. 125, no. 5 (November 2017), pp. 1741–1748, https://doi.org/10.1213/ANE.0000000000002496 (https://doi.org/10.1213/ANE.0000000000002496).

7. Substance Abuse and Mental Health Services Administration, "TIP 63: Medications for Opioid Use Disorder" (July 2021), https://tinyurl.com/yc67nyzp (https://tinyurl.com/yc67nyzp).

8. Centers for Disease Control and Prevention, "Module 5: Assessing and Addressing Opioid Use Disorder (OUD)" (accessed June 9, 2022), www.cdc.gov/drugoverdose/training/oud/accessible/index.html (https://www.cdc.gov/drugoverdose/training/oud/accessible/index.html).

9. Substance Abuse and Mental Health Services Administration, Public Online Data Analysis System, National Survey on Drug Use and Health, 2019 (accessed February 23, 2022), https://pdas.samhsa.gov (https://pdas.samhsa.gov). Statistics from 2020 are also available; however, the Congressional Budget Office decided to report 2019 statistics because they do not include the effects of the pandemic on the prevalence of OUD and its treatment.

10. Priscilla Novak and others, "Behavioral Health Treatment Utilization Among Individuals With Co-occurring Opioid Use Disorder and Mental Illness: Evidence From a National Survey," *Journal of Substance Abuse Treatment*, vol. 98 (March 2019), pp. 47–52, https://doi.org/10.1016/j.jsat.2018.12.006 (https://doi.org/10.1016/j.jsat.2018.12.006).

11. National Institute on Drug Abuse, "Naloxone DrugFacts" (January 2022), https://tinyurl.com/4hxfuj6s (https://tinyurl.com/4hxfuj6s). Some policymakers have expressed concern that misuse of opioids could increase if users felt that access to naloxone reduced the risk of death from overdose; however, research has found that states that increased access to naloxone by enacting naloxone access laws or overdose Good Samaritan laws had lower incidence of opioid-involved deaths without an increase in nonmedical use of opioids. For more information, see Chandler McClellan and others, "Opioid-Overdose Laws Association With Opioid Use and Overdose Mortality," *Addictive Behaviors*, vol. 86 (2018), pp. 90–95, https://doi.org/10.1016/j.addbeh.2018.03.014 (https://doi.org/10.1016/j.addbeh.2018.03.014); and Alexander R. Bazazi and others, "Preventing Opiate Overdose Deaths: Examining Objections to Take-Home Naloxone," *Journal of Health Care for the Poor and Underserved*, vol. 21, no. 4 (November 2010), pp. 1108–1113, https://muse.jhu.edu/article/400754 (https://muse.jhu.edu/article/400754).

12. CBO's analysis of the CDC WONDER database. See Centers for Disease Control and Prevention, National Center for Health Statistics, "About Multiple Cause of Death, 1999–2020" (accessed January 5, 2022), http://wonder.cdc.gov/mcd-icd10.html (http://wonder.cdc.gov/mcd-icd10.html).

13. Organisation for Economic Co-operation and Development, "Opioids Use" (accessed July 5, 2022), https://tinyurl.com/5ybpdafb (https://tinyurl.com/5ybpdafb).

14. CBO's analysis of the CDC WONDER database. See Centers for Disease Control and Prevention, National Center for Health Statistics, "About Multiple Cause of Death, 1999–2020" (accessed January 5, 2022), http://wonder.cdc.gov/mcd-icd10.html (http://wonder.cdc.gov/mcd-icd10.html).

15. Centers for Disease Control and Prevention, National Center for Health Statistics, "Leading Causes of Death" (accessed June 2, 2022), https://tinyurl.com/bdh2uxba (https://tinyurl.com/bdh2uxba). Opioid-involved deaths are included in the accidents (unintentional injuries) category and are not listed as a separate cause of death.

16. Tara Gomes and others, "The Burden of Opioid-Related Mortality in the United States," *JAMA Network Open*, vol. 1, no. 2 (June 2018), https://doi.org/10.1001/jamanetworkopen.2018.0217 (https://doi.org/10.1001/jamanetworkopen.2018.0217).

17. Steven H. Woolf and Heidi Schoomaker, "Life Expectancy and Mortality Rates in the United States, 1959–2017" *JAMA*, vol. 322, no. 20 (November 2019), pp. 1996–2016, https://doi.org/10.1001/jama.2019.16932 (https://doi.org/10.1001/jama.2019.16932).

18. According to data from the Adoption and Foster Care Analysis and Reporting System, parental drug use was involved for an estimated 34 percent of children entering foster care in fiscal year 2019. See Administration for Children and Families, *AFCARS Report #27* (August 24, 2020), www.acf.hhs.gov/cb/report/afcars-report-27 (https://www.acf.hhs.gov/cb/report/afcars-report-27).

19. National Institute on Drug Abuse, "Drug Use and Viral Infections (HIV, Hepatitis) DrugFacts" (accessed February 9, 2022), https://tinyurl.com/48957a86 (https://tinyurl.com/48957a86).

20. Ashley H. Hirai and others, "Neonatal Abstinence Syndrome and Maternal Opioid-Related Diagnoses in the U.S., 2010–2017," *JAMA*, vol. 325, no. 2 (January 2021), pp. 146–155, https://doi.org/10.1001/jama.2020.24991 (https://doi.org/10.1001/jama.2020.24991).

21. Johanna Catherine Maclean and others, "Economic Studies on the Opioid Crisis: Costs, Causes, and Policy Responses," *Oxford Research Encyclopedia of Economics and Finance* (June 2021), https://doi.org/10.1093/acrefore/9780190625979.013.283 (https://doi.org/10.1093/acrefore/9780190625979.013.283).

22. The opioid crisis has also affected state and local government budgets. Health care costs have increased from reversing overdoses and providing treatment to people with OUD. Overdose deaths have resulted in more spending on autopsies. Criminal justice system costs have also increased as a result of the opioid crisis. In addition, decreases in workers' productivity because of OUD can reduce tax revenues. See Liz Farmer, "How Much Is the Opioid Crisis Costing Governments?" *Governing* (February 6, 2018), https://tinyurl.com/5n95m8vv (https://tinyurl.com/5n95m8vv).

23. G. William Hoagland and others, *Tracking FY2019 Federal Funding to Combat the Opioid Crisis* (Bipartisan Policy Center, September 2020), https://tinyurl.com/yztn63ex (https://tinyurl.com/yztn63ex); and Bipartisan Policy Center, *Tracking Federal Funding to Combat the Opioid Crisis* (March 2019), https://tinyurl.com/488at6p5 (https://tinyurl.com/488at6p5).

24. Claire Hou, “Chapter 1: The Opioid Crisis and Foster Care Dynamics” in Hou, “Essays in Labor and Health Economics” (Ph.D. dissertation, Department of Economics, University of Maryland, College Park, 2022), https://doi.org/10.13016/mu1f-b3d6 (https://doi.org/10.13016/mu1f-b3d6); Daniel Max Crowley and others, “Considering the Child Welfare System Burden From Opioid Misuse: Research Priorities for Estimating Public Costs,” *American Journal of Managed Care*, vol. 25, no. 13 (July 2019), pp. S256–S263, https://tinyurl.com/yfh7pr3t (https://tinyurl.com/yfh7pr3t); and Joel E. Segel and others, “Opioid Misuse, Labor Market Outcomes, and Means-Tested Public Expenditures: A Conceptual Framework,” *American Journal of Managed Care*, vol. 25, no. 13 (July 2019), pp. S270–S276, https://tinyurl.com/35er2m7w (https://tinyurl.com/35er2m7w).

25. For more information on the relationship between the opioid crisis and crime, see Johanna Catherine Maclean and others, *The Opioid Crisis, Health, Healthcare, and Crime: A Review of Quasi-Experimental Economic Studies*, Working Paper 29983 (National Bureau of Economic Research, April 2022), www.nber.org/papers/w29983 (http://www.nber.org/papers/w29983).

26. Abby E. Alpert, Steve Schwab, and Benjamin D. Ukert, *Opioid Use and Employment Outcomes: Evidence From the U.S. Military*, Working Paper 30110 (National Bureau of Economic Research, June 2022), www.nber.org/papers/w30110 (http://www.nber.org/papers/w30110); and Curtis Florence, Feijun Luo, and Ketra Rice, “The Economic Burden of Opioid Use Disorder and Fatal Opioid Overdose in the United States, 2017,” *Drug and Alcohol Dependence*, vol. 218 (January 2021), https://doi.org/10.1016/j.drugalcdep.2020.108350 (https://doi.org/10.1016/j.drugalcdep.2020.108350).

27. Teresa A. Rummans, M. Caroline Burton, and Nancy L. Dawson, “How Good Intentions Contributed to Bad Outcomes: The Opioid Crisis,” *Mayo Clinic Proceedings*, vol. 93, no. 3 (March 2018), pp. 344–350, https://doi.org/10.1016/j.mayocp.2017.12.020 (https://doi.org/10.1016/j.mayocp.2017.12.020).

28. David M. Cutler and Edward L. Glaeser, “When Innovation Goes Wrong: Technological Regress and the Opioid Epidemic,” *Journal of Economic Perspectives*, vol. 35, no. 4 (Fall 2021), pp. 171–196, https://doi.org/10.1257/jep.35.4.171 (https://doi.org/10.1257/jep.35.4.171); and Teresa A. Rummans, M. Caroline Burton, and Nancy L. Dawson, “How Good Intentions Contributed to Bad Outcomes: The Opioid Crisis,” *Mayo Clinic*

Proceedings, vol. 93, no. 3 (March 2018), pp. 344–350, https://doi.org/10.1016/j.mayocp.2017.12.020 (https://doi.org/10.1016/j.mayocp.2017.12.020).

29. Abby Alpert and others, "Origins of the Opioid Crisis and Its Enduring Impacts," *Quarterly Journal of Economics*, vol. 137, no. 2 (May 2022), pp. 1139–1179, https://doi.org/10.1093/qje/qjab043 (https://doi.org/10.1093/qje/qjab043).

30. Richard A. Deyo, Michael Von Korff, and David Duhrkoop, "Opioids for Low Back Pain," *BMJ*, vol. 350 (January 2015), https://doi.org/10.1136/bmj.g6380 (https://doi.org/10.1136/bmj.g6380). Evidence on the long-term effectiveness of opioids for chronic back pain continues to be lacking. For more information, see Deborah Dowell, Tamara M. Haegerich, and Roger Chou, "CDC Guideline for Prescribing Opioids for Chronic Pain—United States, 2016," *Morbidity and Mortality Weekly Report*, vol. 65, no. 1 (March 2016), pp. 1–49, http://dx.doi.org/10.15585/mmwr.rr6501e1 (http://dx.doi.org/10.15585/mmwr.rr6501e1).

31. Rachel N. Lipari and Arthur Hughes, *How People Obtain the Prescription Pain Relievers They Misuse*, The CBHSQ Report (Substance Abuse and Mental Health Services Administration, January 2017), https://tinyurl.com/bdeyynas (https://tinyurl.com/bdeyynas).

32. Nora D. Volkow and Carlos Blanco, "The Changing Opioid Crisis: Development, Challenges, and Opportunities," *Molecular Psychiatry*, vol. 26 (February 2020), pp. 218–233, https://doi.org/10.1038/s41380-020-0661-4 (https://doi.org/10.1038/s41380-020-0661-4). The former Assistant Secretary for Health at the Department of Health and Human Services noted the emergence of a fourth wave beginning in 2019. See Steven Ross Johnson, "Q&A: 'We're Entering the Fourth Wave, Which Is Methamphetamine,'" *Modern Healthcare* (August 3, 2019), https://tinyurl.com/muyjdfuu (https://tinyurl.com/muyjdfuu).

33. Heroin users have reported taking psychostimulants as a way of reducing the dose of heroin they use. Some people use psychostimulants to compensate for the depressing effects of opioids. See Wilson M. Compton, Rita J. Valentino, and Robert L. DuPont, "Polysubstance Use in the U.S. Opioid Crisis," *Molecular Psychiatry*, vol. 26, no. 1 (January 2021), pp. 41–50, https://doi.org/10.1038/s41380-020-00949-3 (https://doi.org/10.1038/s41380-020-00949-3).

34. Ibid.

35. Drug Enforcement Administration, "DEA Issues Public Safety Alert on Sharp Increase in Fake Prescription Pills Containing Fentanyl and Meth" (press release, September 27, 2021), https://tinyurl.com/mtjpfcxh (https://tinyurl.com/mtjpfcxh).

36. IQVIA Institute for Human Data Science, *Prescription Opioid Trends in the United States: Measuring and Understanding Progress in the Opioid Crisis* (December 2020), https://tinyurl.com/5a9dk8en (https://tinyurl.com/5a9dk8en).

37. Joseph J. Palamar and others, "Trends in Characteristics of Fentanyl-Related Poisonings in the United States, 2015–2021," *American Journal of Drug and Alcohol Abuse*, vol. 48, no. 4 (2022), pp. 471–480, https://doi.org/10.1080/00952990.2022.2081923 (https://doi.org/10.1080/00952990.2022.2081923).

38. Availability of prescription opioids is measured on the basis of a defined daily dose for statistical purposes, a unit that can be used to compare prescription opioid availability by country. See Organisation for Economic Co-operation and Development, "Opioids Use" (accessed July 6, 2022), https://tinyurl.com/5ybpdafb (https://tinyurl.com/5ybpdafb); and Stefano Berterame and others, "Use of and Barriers to Access to Opioid Analgesics: A Worldwide, Regional, and National Study," *The Lancet*, vol. 387, no. 10028 (April 2016), pp. 1644–1656, https://doi.org/10.1016/S0140-6736(16)00161-6 (https://doi.org/10.1016/S0140-6736(16)00161-6).

39. Nana Wilson and others, "Drug and Opioid-Involved Overdose Deaths—United States, 2017–2018," *Morbidity and Mortality Weekly Report*, vol. 69, no. 11 (March 2020), pp. 290–297, http://dx.doi.org/10.15585/mmwr.mm6911a4 (http://dx.doi.org/10.15585/mmwr.mm6911a4).

40. Mark J. Pletcher and others, "Trends in Opioid Prescribing by Race/Ethnicity for Patients Seeking Care in U.S. Emergency Departments," *JAMA*, vol. 299, no. 1 (January 2008), pp. 70–78, https://doi.org/10.1001/jama.2007.64 (https://doi.org/10.1001/jama.2007.64).

41. Use of OUD treatment is higher among non-Hispanic White people. Furthermore, the type of OUD treatment used can vary by race and ethnicity: Non-Hispanic White people are more likely to use buprenorphine, whereas methadone treatment is more prevalent in communities where the majority of people are Black or Hispanic. See Centers for Disease Control and Prevention, "Cocaine and Psychostimulant-Involved Overdose Deaths Disproportionately Affect Racial and Ethnic Minority Groups" (October 19,

2021), https://tinyurl.com/2aa66hph (https://tinyurl.com/2aa66hph); Max Jordan Nguemeni Tiako, "Addressing Racial and Socioeconomic Disparities in Access to Medications for Opioid Use Disorder Amid COVID-19," *Journal of Substance Abuse Treatment*, vol. 122 (March 2021), https://doi.org/10.1016/j.jsat.2020.108214 (https://doi.org/10.1016/j.jsat.2020.108214); and William C. Goedel and others, "Association of Racial/Ethnic Segregation With Treatment Capacity for Opioid Use Disorder in Counties in the United States," *JAMA Network Open*, vol. 3, no. 4 (April 2020), https://doi.org/10.1001/jamanetworkopen.2020.3711 (https://doi.org/10.1001/jamanetworkopen.2020.3711).

42. Sean F. Altekruse and others, "Socioeconomic Risk Factors for Fatal Opioid Overdoses in the United States: Findings From the Mortality Disparities in American Communities Study (MDAC)," *PLOS One*, vol. 15, no. 1 (January 2020), https://doi.org/10.1371/journal.pone.0227966 (https://doi.org/10.1371/journal.pone.0227966).

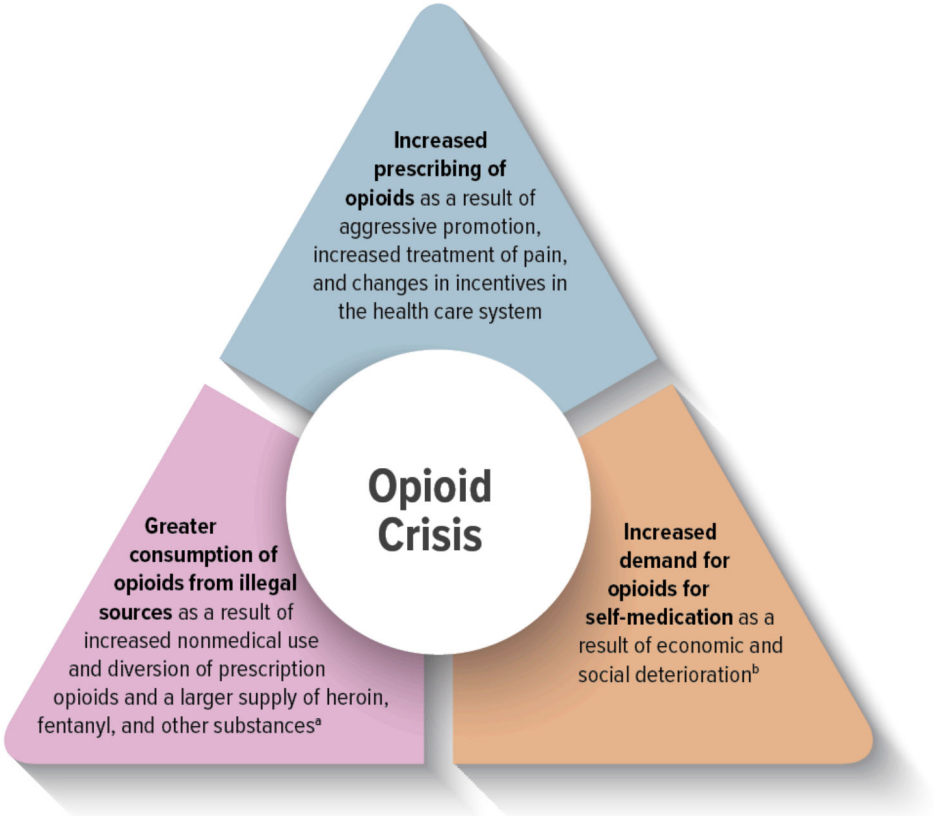
Chapter 2

Factors Contributing to the Opioid Crisis

Researchers have identified a variety of factors that led to the opioid crisis, including increased prescribing of opioids, changes in illegal opioid markets, and societal changes that may have resulted in increased demand for opioids by people experiencing declines in real wages and social cohesion (see Figure 2-1). Those factors also reinforced each other. For example, increasing the supply of opioids had a greater effect on society because the demand for opioids also increased.[1] But the relative importance of individual contributors to the crisis has not been established.[2]

Figure 2-1.

Factors Contributing to the Opioid Crisis



Notes ▾

Increased Prescribing of Opioids

The increased prescribing of opioids that contributed to the crisis resulted from three factors that reinforced each other: aggressive promotion efforts by pharmaceutical companies, greater emphasis on assessing patients' pain and treating it medically, and changes in incentives in the health care system.

Aggressive Promotion of Prescription Opioids by Pharmaceutical Companies

Pharmaceutical companies encouraged the prescribing of opioids in several ways:

- They promoted the use of prescription opioids to prescribers and pharmacists and encouraged them to endorse the prescribing of opioids to their colleagues,
- They compiled profiles of individual physicians' prescribing practices to target advertising toward physicians who were already heavy prescribers of opioids, and
- They distributed starter coupons that provided patients with free prescription opioids.[3]

Research has shown that some of the marketing materials used by pharmaceutical companies were misleading. For example, some advertisements promoted the use of certain prescription opioids for the treatment of chronic, non-cancer-related pain even though the clinical evidence was lacking. Some promotional materials also understated the addictive potential of prescription opioids.[4] Research has demonstrated that areas that were subject to more intense opioid marketing experienced greater growth in opioid prescribing.[5]

Increased Emphasis on Assessment and Medical Treatment of Patients' Pain

Clinical norms about managing patients' pain and prescribing opioids for it began to change in the 1980s, in part because of two widely cited papers.[6] Those studies, which were narrow in scope, were interpreted as evidence that patients who were prescribed opioids to treat pain had minimal risk of developing opioid use disorder.[7]

In addition, nonprofit organizations such as the American Academy of Pain Management and the American Pain Society—both funded by pharmaceutical companies—sought to raise awareness about pain management.[8] In 1995, the American Pain Society began a campaign that characterized pain as the "fifth vital sign."[9] The following year, the two organizations released a consensus statement that advocated for the use of opioids to treat chronic, non-cancer-related pain.[10] In 2000, the Joint Commission, an organization that accredits hospitals, introduced new standards for the regular and systematic monitoring and management of pain in hospitalized patients. The new standards regarded pain assessment

and control as a "patients' rights issue."[11] In addition, one of the pharmaceutical companies, Purdue Pharma, coined the term "opiophobia."[12] It was used to refer to providers' "unreasonable fear of opioid use."[13] Many providers responded to the updated guidance from organizations by prescribing more opioids.[14] Research has found that counties with higher prevalence of pain were shipped more prescription opioids and experienced more deaths from overdoses of prescription opioids.[15]

Changes in Incentives in the Health Care System

Changes in incentives in the health care system also encouraged the prescription of opioids. Some of those incentives affected the way providers were assessed and reimbursed. Other incentives affected the way opioids were prescribed.

Assessment of physicians and hospitals changed in ways that resulted in greater opioid prescribing. Standards for assessing physicians were affected by model guidelines issued by the Federation of State Medical Boards in 1998. The guidelines, which were used to regulate and discipline physicians, encouraged the use of opioids for chronic, non-cancer-related pain and discouraged the use of disciplinary action for physicians prescribing opioids.[16] Hospitals' assessment and payments were affected by the Hospital Consumer Assessment of Healthcare Providers and Systems survey, which included questions about patient satisfaction with pain management. In 2010, survey scores were incorporated into the value-based incentive payments in the Hospital Value-Based Purchasing Program, which rewarded hospitals for providing high-quality care. According to studies, some providers felt pressure to overprescribe opioids to avoid receiving lower patient satisfaction scores.[17]

Changes in other incentives in the health care system resulted in the unintended consequence of increasing the use of opioids and their diversion to people who were not prescribed them. In response to demands to reduce the "hassle factors" of refilling prescriptions—one of the barriers to patient pain control—some insurance companies and retail pharmacists sought to lower the number of opioid refill requests by charging less for prescriptions with larger numbers of pills.[18] As a result, the availability of opioids for legal

and illegal consumption increased. In addition, some insurance companies placed restrictions, including utilization management and prior authorization rules, on the potentially more costly nonopioid alternatives to pain management such as physical therapy, which could have resulted in missed opportunities to direct patients toward potentially safer and more effective treatments for pain than prescription opioids.[19]

Greater Consumption of Opioids From Illegal Sources

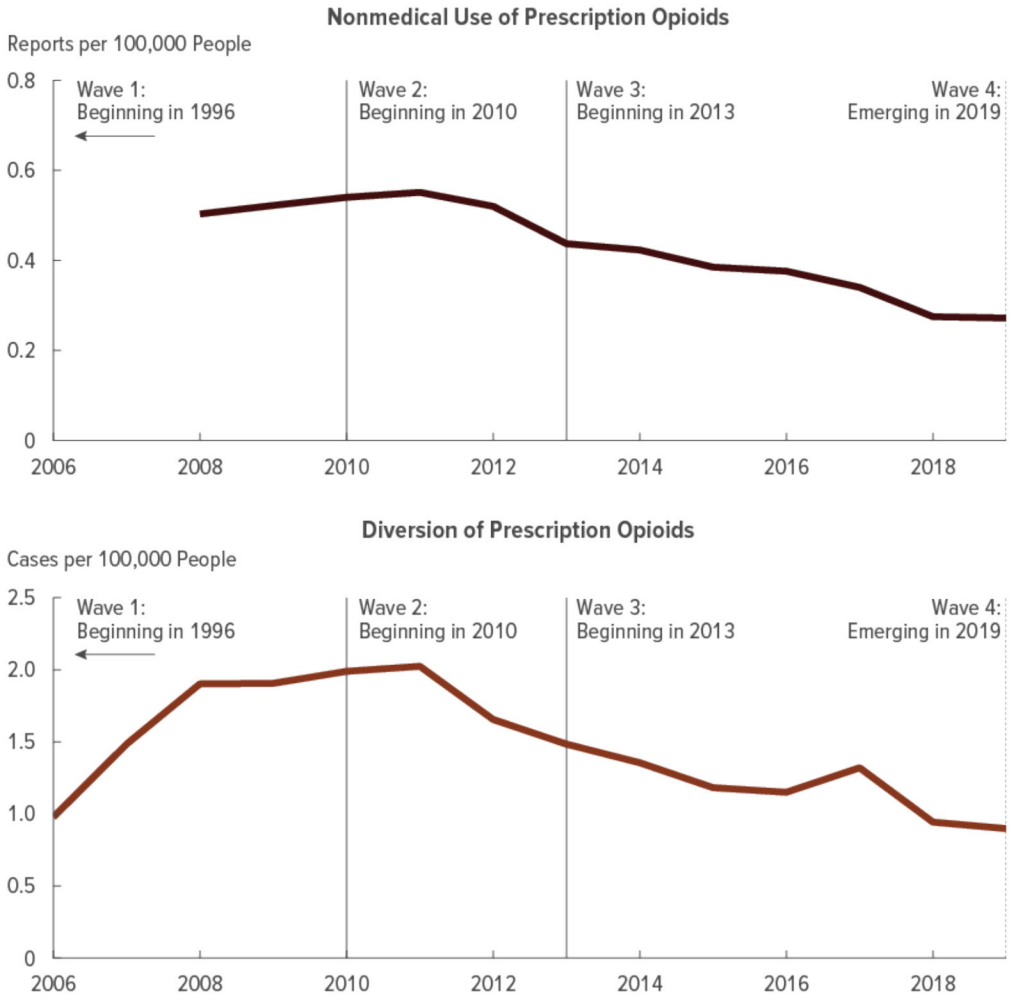
Changes in illegal opioid markets also contributed to the opioid crisis. The increased supply of prescription opioids made them more available for nonmedical use and diversion in the earlier years of the crisis. More recently, demand for heroin and fentanyl and related substances increased because of lower prices for those drugs and reduced availability of prescription opioids.

Increased Nonmedical Use and Diversion of Prescription Opioids

Nonmedical use and diversion of prescription opioids changed along with the supply of the drugs.[20] In data available from 2008 to 2019, nonmedical use of prescription opioids increased until 2011 and then decreased until 2019 (see Figure 2-2, top panel). Trends in the nonmedical use of prescription opioids coincide with trends in the amount of prescription opioids dispensed (see Figure 1-1). Common sources of prescription opioids for nonmedical use include diversion from friends or relatives, physicians, and drug dealers or strangers.[21] Trends in diversion of prescription opioids followed a similar pattern: In data available from 2006 to 2019, diversion increased until 2011 and then decreased for most years until 2019 (see Figure 2-2, bottom panel).

Figure 2-2.

Nonmedical Use and Diversion of Prescription Opioids



Nonmedical use of prescription opioids increased until 2011 and then decreased as dispensing of prescription opioids fell and use of illicitly manufactured opioids increased.

Diversion of prescription opioids increased with the availability of the drugs until 2011 and then decreased for most years afterward as nonmedical use of prescription opioids declined and people used illegally manufactured opioids instead.

Notes ▾

Changes in the Market for Heroin and for Fentanyl and Similar Substances

The supply of heroin and fentanyl increased as a result of changes in the markets for those drugs and the decreased availability of diverted prescription opioids. Changes in international markets resulted in an influx of lower-priced heroin to the United States.[22] The retail price of a gram of pure heroin fell from $1,237 in 1992 to $552 in 2002 and to $465 in 2012 (all in 2012 dollars).[23] Heroin use also increased as federal and state policies limited the availability of prescription opioids for misuse in response to concerns about the rising number of overdose deaths involving prescription opioids.[24] That shift is consistent with studies that found that about 80 percent of heroin users used prescription opioids nonmedically before initiating heroin use.

Other reasons people transition from nonmedical use of prescription opioids to heroin include the higher potency of heroin, the ease with which it can be manipulated for nonoral consumption, and its lower cost.[25] The risks of overdose and the development of certain medical conditions (for example, HIV and hepatitis C) are higher with heroin use than with nonmedical use of prescription opioids.[26]

In addition, the supply of fentanyl and related substances increased because of changes in the market for those drugs. The ability to purchase such substances online (and the associated use of shipping services for distribution) has facilitated the purchase of fentanyl, related substances, and the precursor chemicals for making fentanyl, because they are relatively cheap to transport over long distances by mail and parcel delivery. Mexico is the primary source of illicitly manufactured fentanyl, which is made from precursor chemicals that are largely purchased from China.

Fentanyl can be produced more cheaply than heroin because it is made from ingredients in a lab. In addition, the chemicals required to make fentanyl are not always regulated and can be acquired relatively easily from countries that produce chemicals and pharmaceuticals—allowing fentanyl manufacturers to adjust if the supply from a particular source is reduced.[27] Fentanyl is also 50 to 100 times more potent than heroin, which allows it to be transported in smaller quantities and to be smuggled and distributed