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Highlights

Highlights of [GAO-08-1095](#), a report to the Committee on Foreign Affairs, House of Representatives

Why GAO Did This Study

Semiconductors are key components in weapons systems and consumer electronics. Since semiconductors have both civilian and military applications, U.S. export control policy treats the equipment and materials used to manufacture semiconductors as “dual-use” items, and controls the export of these items through licensing requirements to sensitive destinations such as China.

You requested that we update our 2002 report on China’s semiconductor manufacturing capabilities to address the (1) evolution of China’s capabilities since 2002, (2) changes to U.S. export control policies over the sale of semiconductor manufacturing equipment and materials to China since 2002, and (3) the advantages and limitations of these changes.

What GAO Recommends

To enhance oversight, Commerce should suspend the VEU program to China until an amended or new agreement is reached to conduct onsite reviews and VEU-specific procedures for conducting on-site reviews are established.

Commerce disagreed with our recommendation, stating that it can use a classified 2004 agreement with China to conduct on-site reviews. However, use of the agreement imposes an additional burden on validated end-users. Commerce also maintains it has procedures for on-site reviews, but they are still in draft form and have not cleared the interagency review.

To view the full product, including the scope and methodology, click on [GAO-08-1095](#). For more information, contact Joseph A. Christoff at (202) 512-8979 or christoffj@gao.gov.

EXPORT CONTROLS

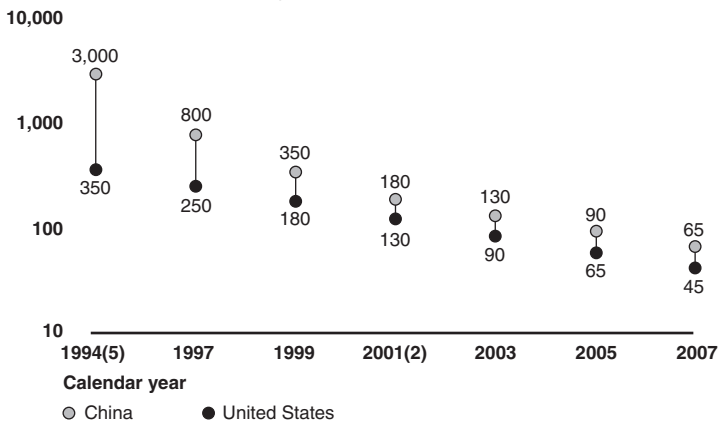
Challenges with Commerce’s Validated-End User Program May Limit Its Ability to Ensure That Semiconductor Equipment Exported to China Is Used as Intended

What GAO Found

The gap between U.S. and Chinese commercial semiconductor manufacturing capabilities, as measured by the feature size of the semiconductors produced, rapidly narrowed between 1994 and 2002. Since 2002, China’s semiconductor manufacturing capabilities have continued to advance but remain one generation behind state-of-the-art semiconductors produced in the United States. China’s most advanced semiconductor manufacturing companies continue to rely on equipment and materials from the United States, Europe, and Japan to improve their manufacturing capabilities. However, China has developed an indigenous capacity to build some types of advanced semiconductor manufacturing equipment, which may soon provide companies in China with a domestic source of equipment capable of producing semiconductors that are close to state of the art.

U.S. and Chinese Semiconductor Manufacturing Capability, 1994 through 2007

Feature size in nanometers (logarithmic scale)



A semiconductor’s feature size, or the size of the components on a semiconductor, is measured in nanometers and is used to define the current level of technology. Each reduction in feature size—for example, from 65 to 45 nanometers—is considered a move to a new generation of technology.

Source: GAO analysis of data provided by Semiconductor Manufacturing International Corporation and other semiconductor manufacturing facilities in China, Intel Corporation, and the International Technology Roadmap for Semiconductors.

Since 2002, U.S. export control policies over semiconductor equipment and materials to China have become more “end-user” focused, with the introduction of the Validated End-User (VEU) program, a parallel licensing framework that allows select pre-screened Chinese end-users to receive controlled items, including some semiconductor equipment and materials, without a license.

The Department of Commerce anticipated that the VEU program would facilitate trade to China and enhance U.S. security; however, challenges with program implementation may limit Commerce’s ability to ensure items are being used as intended. Specifically, Commerce has not reached a VEU-specific agreement with the Chinese government for conducting on-site reviews of validated end-users, a mechanism cited by Commerce as critical for ensuring program compliance. Instead, as a stopgap measure, Commerce is attempting to conduct VEU on-site reviews under a 2004 agreement. In addition, Commerce lacks procedures for conducting on-site reviews, though the validated end-user program was introduced in June 2007.