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TECH

TSMC's Arizona Chip Plant, Awaiting Biden Visit, Faces Birthing Pains

Taiwanese company cites high costs and shortage of skilled personnel as it pushes to open $12 billion factory next year

TSMC founder Morris Chang said the company plans to produce chips with advanced 3-nanometer technology in Arizona.

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By Yang Jie Follow

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The $12 billion Arizona semiconductor plant under construction that President Biden is visiting Tuesday represents U.S. hopes for a renaissance in manufacturing, but the Taiwanese company building it says it won't be easy.

High costs, lack of trained personnel and unexpected construction snags are among the issues cited by Taiwan Semiconductor Manufacturing Co. TSM **-2.52%** ▼ as it rushes to get the north Phoenix factory ready to start production in December 2023.

"A range of construction costs and project uncertainty in Phoenix makes building the same advanced logic wafer fab in Taiwan considerably less capital intensive," TSMC said in a letter last month to the Commerce Department.

"The real barrier" to setting up manufacturing in the U.S. "is comparative cost to build and operate," it said.

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Nonetheless, TSMC, which counts Apple Inc. as its biggest client, is going all-in on the project, with backing from Washington.

On Tuesday, it is set to hold a tool-in ceremony at the Arizona plant, symbolically moving the first batch of equipment onto the shop floor. The White House said Mr. Biden would attend, and a TSMC vice president, Peter Cleveland, said on LinkedIn that the president would make remarks about the company's future manufacturing plans. Other top administration officials and business leaders are also expected to attend.

The visit by a president to a foreign company's factory reflects the U.S. reliance on TSMC to give American chip manufacturing a lift. The U.S. makes about 12% of the world's chips compared with 37% three decades ago, according to the U.S.-based Semiconductor Industry Association.

Building deeper ties with the U.S. makes political sense for the Taiwan-based chip maker during a period of tensions between Washington and Beijing. It also allows for better cooperation in developing new products with U.S.-based clients such as Apple and Nvidia Corp.

Mr. Biden has been pushing to bring more high-tech manufacturing to the U.S. In August, he signed a law that includes $52 billion in direct aid for building semiconductor plants, which lawmakers viewed as key to ensuring American technology leadership and securing supply chains.

Last month in Bangkok, TSMC founder Morris Chang, confirming a Wall Street Journal report, said the company planned to produce chips with advanced 3-nanometer technology in Arizona, in addition to the 5-nanometer chips that the factory is initially set to produce. TSMC said it has started on a second building that could serve as an additional chip factory but hasn't made a final decision.

In addition to the U.S., TSMC also is expanding in Asia.
PHOTO: PICHI CHUANG/REUTERS

"This will be the most advanced [chip] capacity in the U.S. and is very important for the U.S.," said Mr. Chang.

TSMC's specialty is making chips designed by other companies—which are often "fabless" and rely on the Taiwanese company's manufacturing prowess to bring their blueprints to life.

TSMC executives have said it isn't easy to re-create in America the manufacturing ecosystem they have built over decades in Taiwan, drawing on local engineering talent and a network of suppliers including many in East Asia. Mr. Chang said the cost of making chips in Arizona may be at least 50% higher than in Taiwan.

The company's letter to the Commerce Department, in which it responded to the department's request for public comments about U.S. chip-subsidy programs, was frank in listing the problems that have emerged during the Arizona construction.

It named six, including federal regulatory requirements, "unexpected work developments" during construction and additional site preparation, all of which it said raised costs.

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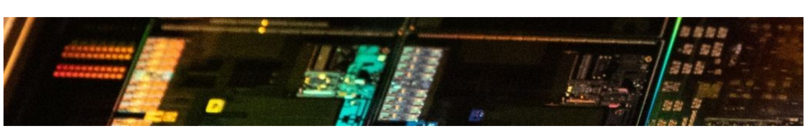

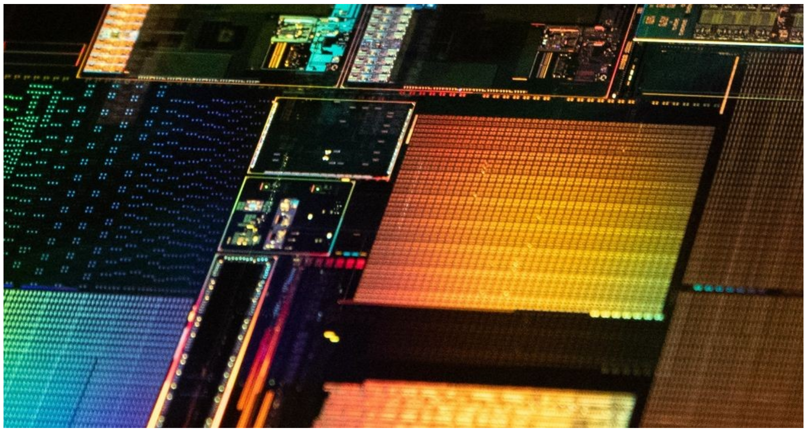

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TSMC has shipped as much equipment as possible from Taiwan, including clean-room equipment and chip-making tools, because American suppliers cost more or aren't available, people familiar with the project said.

Another challenge is personnel. TSMC has invested more in recruiting after struggling to find new engineering graduates in the U.S., said people familiar with its efforts. Engineers hired in the U.S. are sent to Taiwan for a year or a year and a half of training, they said.

The company said TSMC Arizona currently has more than 1,000 employees and other personnel, and the number is expected to grow to 2,000 next year.

The company is also sending Taiwan-based engineers to Arizona to augment staffing, luring them with doubled salaries and other benefits, according to people familiar with the matter.

In addition to the U.S., TSMC is expanding in Asia to help countries that want to strengthen local semiconductor production out of national-security concerns. The company is considering expanding beyond a $7 billion plant already under construction in Japan, and it is also in talks with Singapore about potentially building a multibillion-dollar chip factory. However, it is keeping its most advanced manufacturing in Taiwan.

—Keith Zhai contributed to this article.

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