**What's Happening in the Semiconductor Chip World?**

Many people were very surprised to learn that we do not make the newest and most powerful semiconductor chips in the world anymore. And we do not even make enough semiconductor chips to supply our American companies, such GM, Ford and other automobile manufacturers which has caused our the entire American automobile manufacturing firms to delay our production waiting for future chip orders to be filled from Asian chipmakers. The thousands of orders for the new Ford 150 EV recently announced, are not going to be ready for delivery soon.

It is reported that the 75% of all advanced semiconductor chips are now manufactured in Asia, primarily in Taiwan and South Korea. Taiwan Semiconductor Manufacturing Company (TSMC) now produces semiconductor chips for the whole world, and its best chips are 30% faster than our American leader, Intel Corporation.

According to a **60 Minutes**, TSMC has begun building 10 semiconductor plants in Arizona. Each plant costs $10 billion, so 10 TSMC plants will cost $100 billion dollars. When these plants are completed, most of the world's most advanced chips will be made in America. This technical development is a game changer. There are so many products today that require advanced chips.

TSMC is a firm originated by Dr. Morris Chang, a Chinese American, who was educated at MIT and Stanford University, and worked at Texas Instruments for 25 years before deciding to open TSMC in Hsinchu, Taiwan. TMSC was the first, and now the largest and most advanced semiconductor firm in the world. The TSMC story is unusual and stunning.

Thousands of today's electronic products require advanced chips. Every cell phone, computer or digital cameras/watches, televisions, washing machines, refrigerators and even LED bulbs require a chip.

Many components of computer networks like ATMs for banks, medical networks to link medical staffs to patients and life support systems (medical alert devices and elderly care robots), emergency networks for police and firefighters, mass transportation system management, and even the simple rice cooker needs a chip to cook rice perfectly.

TSMC is also a major provider of semiconductors to China. China is trying to make advanced semiconductors, but its technology is years behind TSMC. Its path forward has been obstructed as it needs the most advanced chip making technology from the Dutch firm, ASML. ASML's chip making technology enables TSMC to build a single chip that can store a billion circuits. When his staff briefed former President Donald Trump about the capabilities of ASML, he convinced ASML not to sell its technology to China.

Like all advanced nations, access to advanced semiconductors is very important to the continued development of modern China. TSMC supplies China with semiconductors, if China were to attack Taiwan, TSMC's chip making machines can easily and quickly be sabotaged. That would cut off a vital supply of semiconductors needed by China to continue its economic competitiveness.

IMO, the seven Chinese leaders who manage China, all with PhDs in science, must be aware of the importance of semiconductors to the future of China, and will weigh the risk to China, if they attack Taiwan and lose access to their most important source of advanced semiconductors.

The country that controls the capability to make the most powerful semiconductor chips in the world, will have great leverage in the world. That will be America when the ten TSMC "fabs," are built in America.

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**Sources:**

**SIA Applauds Committee Approval of Endless Frontier Act**

**Wednesday, May 12, 2021, Semiconductor Industry Association**

**WASHINGTON – May 12, 2021** – The Semiconductor Industry Association (SIA) today released the following statement from President and CEO John Neuffer commending the Senate Commerce Committee’s approval of the Endless Frontier Act (S.1260), bipartisan legislation that seeks to maintain and build on U.S. science and technology leadership by authorizing more than $100 billion for science and technology initiatives, including semiconductor research. The Committee approved the legislation by a bipartisan vote of 24-4, and it is now expected to move to the Senate floor for consideration. The bill was introduced last month by Sens. Chuck Schumer (D-N.Y.) and Todd Young (R-Ind.) and a bipartisan group of cosponsors. SIA represents 98% of the U.S. semiconductor industry by revenue and nearly two-thirds of non-U.S. chip firms.

“The Endless Frontier Act would reinforce U.S. leadership in the critical technologies of the future, including semiconductors, and strengthen America’s economy, national security, and global competitiveness. We appreciate the leadership of Sens. Schumer and Young in advancing this bipartisan legislation and applaud the Senate Commerce Committee for approving it. As the bill moves to the Senate floor, we look forward to working with leaders in Congress to include needed funding for domestic semiconductor manufacturing and research to ensure the United States is home to a bigger share of global chip production and innovation for years to come.”

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**Following President Biden’s Remarks to Congress, SIA Urges Prompt Action to Enact Bold Investments in Domestic Semiconductor Manufacturing and Research**

Wednesday, Apr 28, 2021, 10:00pm

by **Semiconductor Industry Association**

**WASHINGTON – April 28, 2021** – The Semiconductor Industry Association (SIA) today released the following statement from President and CEO John Neuffer regarding President Biden’s first address to a joint session of Congress.

“During tonight’s address to Congress and throughout his first 100 days in office, President Biden has demonstrated a commitment to strengthening America’s leadership in semiconductors through robust investment in domestic chip manufacturing, design, and research. The President and a large, bipartisan group of leaders in Congress understand semiconductors are at the heart of our economic strength, national security, digital infrastructure, and global competitiveness, and we appreciate their support and leadership.

“The President’s recent call for $50 billion to fund the semiconductor manufacturing and research provisions in the CHIPS for America Act is bold and necessary if the U.S. is to remain globally competitive and lead in the technologies of tomorrow. Now is the time for leaders in Washington to shoulder in by enacting legislation that funds these important provisions, which will ensure more of the chips our country needs are produced on U.S. shores.”

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**Arizona Becomes US Semiconductor Central**

***Jim McGregor Contributor, Tirias Research Contributor Gro****up*

Arizona has high interest because it has the five key factors forsemiconductor fabs – available land, infrastructure (power, water, etc.), skilled talent, no natural disasters, and favorable tax incentives. Motorola and other early semiconductor companies established Arizona as a leader in semiconductor design and manufacturing in the 1950s. Since then, the universities, utilities, and government have continued to improve the infrastructure and talent necessary for semiconductor manufacturing.

While Intel will receive favorable local tax incentives for the new fabs, this is no different than the incentives offered to other industries like automotive. However, because semiconductor fabs require a huge upfront investment, there is an unwritten guarantee that the fabs will operate 24/7 for at least 10 years or three generations of products. But, as we have seen with Intel’s fab strategy, even at the anticipated end of life of these fabs, they can be stripped and refitted for another life cycle or converted for use other purposes like research and development.

Intel has a long history in Arizona and has always indicated it as being one of its primary locations for future investment. That investment not only pays off for the future Intel fabs, but for others semiconductor companies looking to expand fab capacity. Additionally, Arizona gains valuable jobs and continued investment in developing and attracting talent to the area.

The author and members of the Tirias Research staff do not hold equity positions in any of the companies mentioned. Tirias Research tracks and consults for companies throughout the electronics ecosystem from semiconductors to systems and sensors to the cloud. No members of Tirias Research have consulted for Intel, Microchip, Motorola, NXP, TSMC, and companies throughout the semiconductor industry.

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**On March 2, 2021 it was reported on Sixty Minutes.**

**TSMC makes the most advanced chips for Apple, Google, Microsoft. They are part of every Apple product manufactured. TSMCs best chips are 30% faster than Intel’s best chips!**

On **60 Minutes** it was reported that TSMC is investing $100 billion dollars in Arizona to build 10 semiconductor plants. TSMC already possesses the semiconductor manufacturing technology that is as much as 10 years in advance of the rest of the world. Donald Trump persuaded ASML not to sell its special super advanced manufacturing technology to SMIC of China. Advance chips are essential for everything from smart phones, autos, jet fighters, hospital ventilators.

Intel is adding 10 modern plants in Arizona, costing $10 billion each.

**Today 75% of semiconductor manufacturing is based in Asia (mainly Taiwan and South Korea)**

Intel's plant outside of Phoenix is the model of of ultra cleanliness. Dust is the enemy when building modern semiconductors. One chip, storing a billion circuits can take up to 6 months to build. Modern chips have billions of circuits. Each plant costs $10 billion. Intel is the only American company today that manufacturers today's advanced chips. To compete effectively with the rest of the world (mainly Asia) Intel and other chip makers need lots of funding, tax incentives and other incentives to be competitive.

Intel made $78 billion in profits in 2020.

It will take years to supply demands for all smart devices needed now.