



Electronics Update

THE GLOBAL CHIP SHORTAGE

Today's Talking Points

- Matt Simms and Simms Electronics background.
- Current snapshot of lead times in electronics.
- Chips and why they are so important in electronics.
- Global Chip Shortage – How did we get here and where are we heading?

My Background

- Founder and CEO of Simms Electronics.
- 30 years of electronic product design and manufacturing experience.
 - 4 Years in Automotive
 - 6 Years in Electronic Contract Manufacturing
 - 20 Years in Electronic Product Design
- Technology entrepreneur with a passion for design.
- Founder of three companies.
- Developed products in numerous electronic industries including IoT, industrial electronics, building automation, automotive, medical, and professional audio.

Who is Simms Electronics?

- We are an electronic product design company located in Grand Rapids.
- Founded in 2001.
- Primary focus is developing custom electronic products, specializing in connected IoT products.
- Services include:
 - Embedded hardware and electronic circuit design.
 - Embedded firmware development.
 - Printed circuit board design and layout.
 - Product testing.
 - Sustaining services of electronic products.
 - Full stack web development for IoT devices.
 - Android and iOS applications for IoT products.

Snapshot of Lead-Times in Electronics

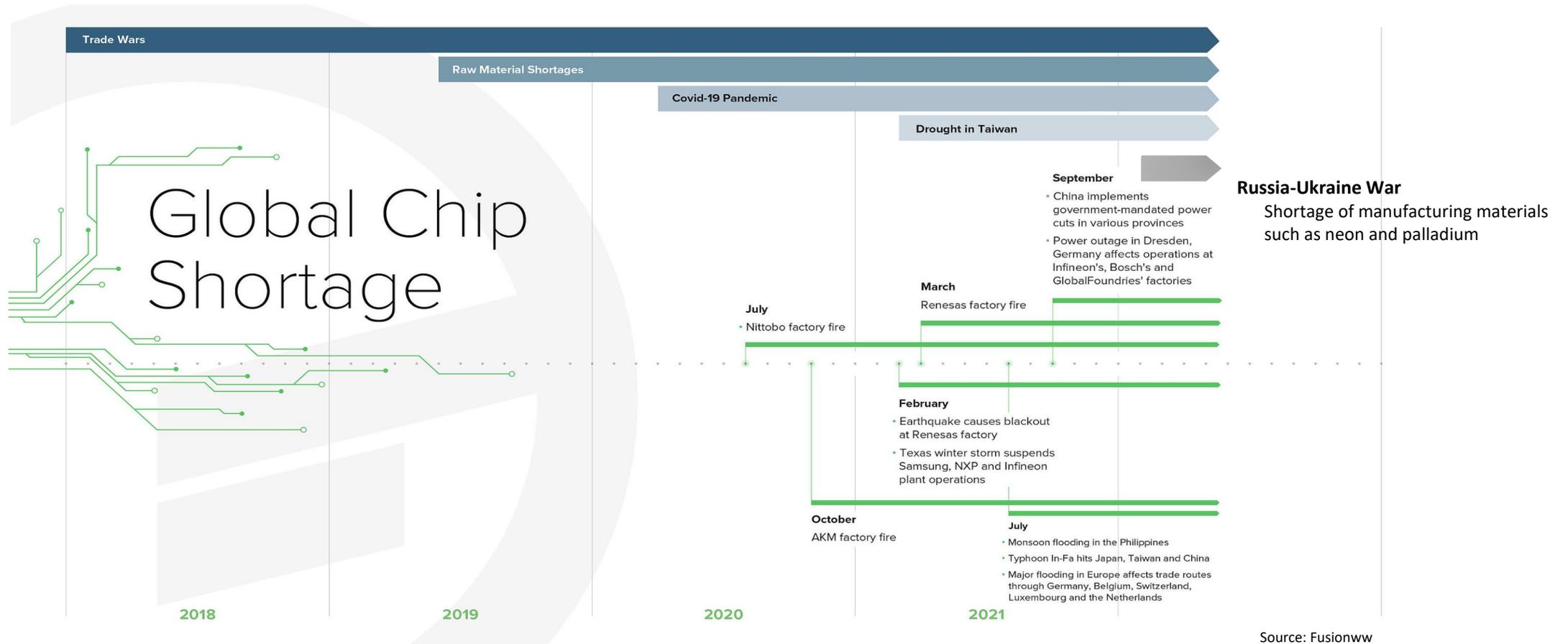
- **Semiconductor (Chips/ICs)**
 - 26-week average
 - 80% of lead-times are at 52 weeks in Qty.
 - Stabilizing.
- **Passive (resistors and capacitors)**
 - 15 -week average
 - **Increasing** (capacitors)
- **Electromechanical**
 - 20 weeks average, up to 52+ weeks
 - Stable.
- **Connectors**
 - 15-week average
 - **Increasing.**
- **Electromechanical**
 - 20 weeks average, up to 52+ weeks
 - Stable.
- **Power Electronics**
 - 30 weeks average, up to 48 weeks
 - Stable.

What are semiconductors (chips/ICs)?

- Semiconductors (chips) are the brains behind nearly every type of modern computing device we now rely on to run our everyday lives.
- They are in almost everything that has a battery, or what we plug into the wall, from toasters and toothbrushes to smartphones and cars.
- Products with semiconductors now make up nearly 40 percent of exports and about 15 percent of gross domestic product.
- As products around us get “smarter” and the demand for electronics grows around the world, the demand for semiconductors will continue to skyrocket.

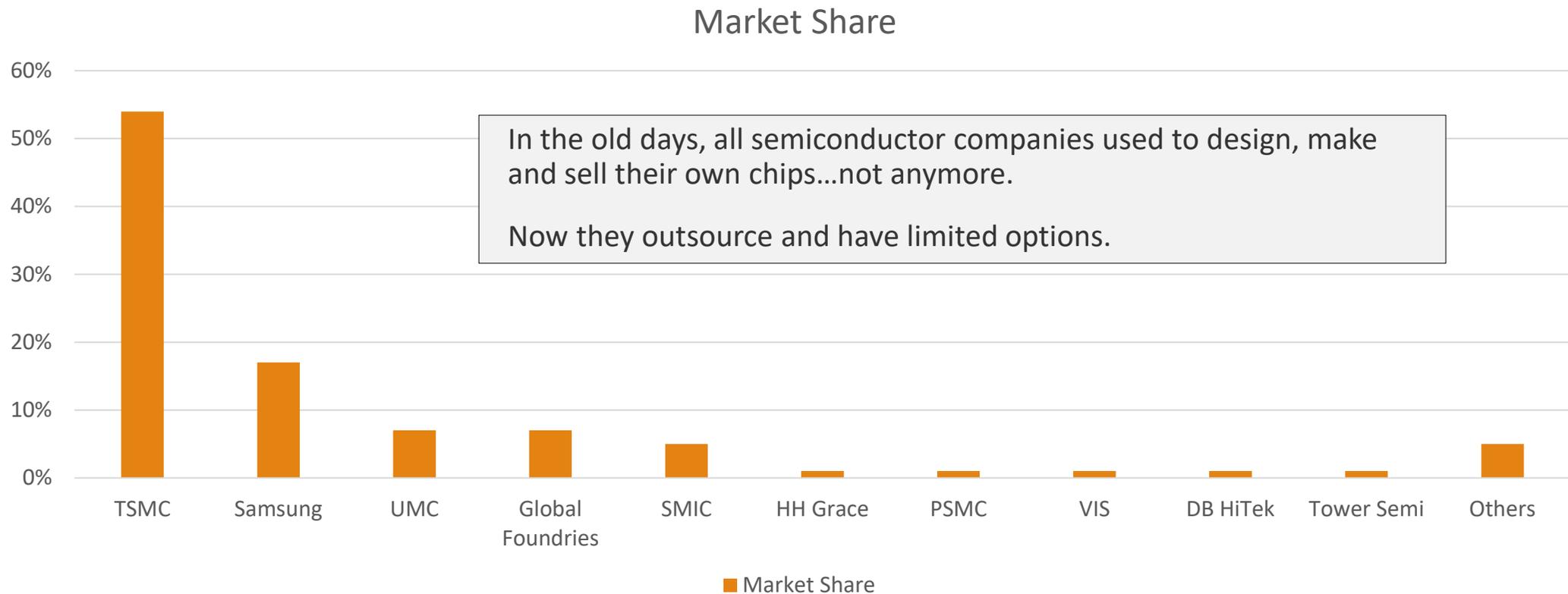
How did we get here?

Chip shortage time-line.



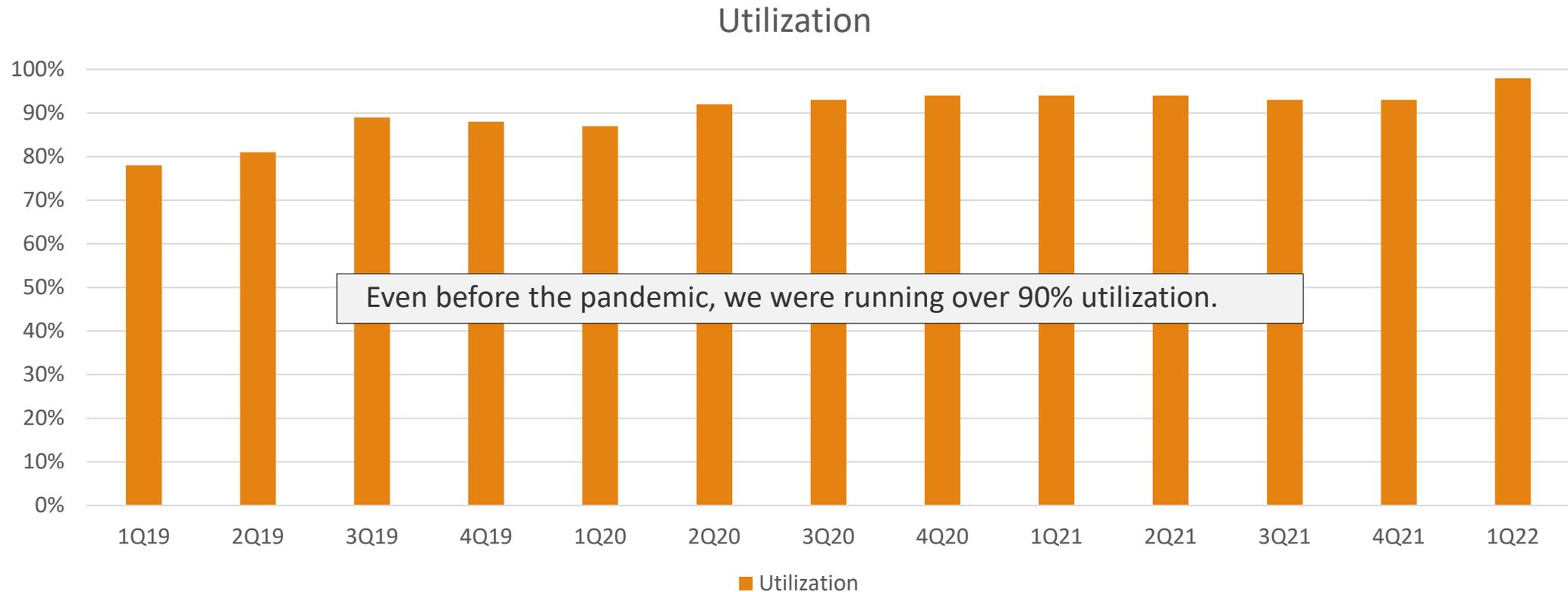
How did we get here?

Top 10 Semiconductor fabrication plants by Market Share.



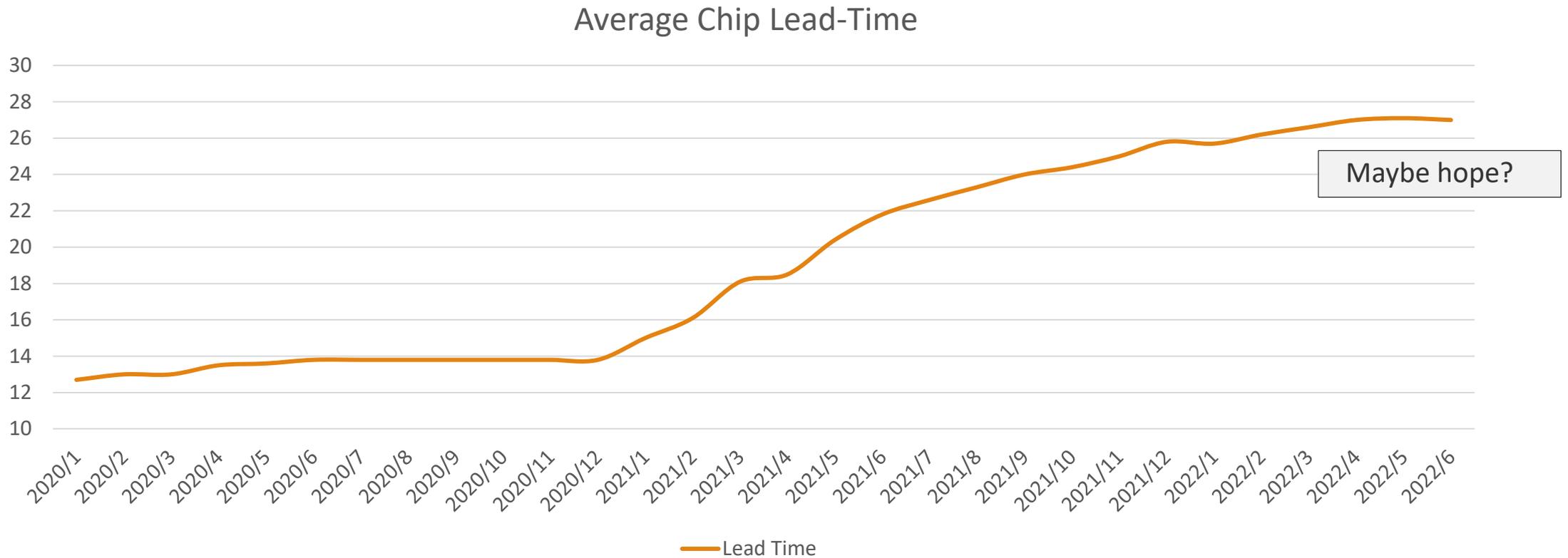
How did we get here?

Riding the edge.



Where are we now?

Lead-times for semiconductors.



Where are we now?

Chip problems we are facing today.

- Hoarding semiconductors.
- Brokers have the control. Some charging double+ the original costs.
- Eighty percent of the larger production quantity lead times are still at 52 weeks. It's unprecedented.
- Low tech vs Hi tech
 - It might be easy to get the cheap low-tech chips for your electronic mirrors, for example, but hard to find the expensive, high-performance ones that operate the backup camera or the battery. Or it could be the other way round. You could be able to find the advanced chips, but not the cheap 25-cent ones. Either way, it's a problem.

Where are we now?

Chip lead-time examples of new designs at Simms.

- ST Microelectronics MCU quoted 104 weeks.
- TI (Texas Instruments) motor control and power production quoted at 42 weeks.
- Microchip MCUs quoted at 24-52 weeks.
- Silicon Labs Bluetooth mixed circuit MCU quoted at 48 weeks.
- Costs up 10% - 20%.

What does the future look like?

Semiconductor projections.

- Stability begins first half 2023
- Reduction of lead time will begin Mid 2023.
- Long lead times will continue until late 2023 and early 2024.

What does the future look like?

Why does this not change quickly for semiconductors?

- Process of making chips is brutally expensive, time intensive and extremely complicated.
- First, you have to dig tons of quartz rock out of the ground. Then you have to heat it to the point where the raw silicon can be extracted.
- One silicon smelting process line alone takes up enough energy to supply more than 80,000 average homes per year.
- Chip fabrication plants, whether they be for low-tech or high-tech chips, can take as many as five years to build and cost billions of dollars.
 - Older technology, older lagging edge - starts from \$5 plus billions dollars.
 - New technology, like Intel, can cost up to \$15 plus billion dollars.

What does the future look like?

More semiconductor factories in the works.

- Geographical diversification of chipmaking is one solution companies are opting for in a strategic move to secure the supply chain and provide a long-term fix amid the turbulence the semiconductor industry has experienced. In their initiatives to do just this, US companies have [urged the Biden administration](#) to invest in domestic semiconductor manufacturing to buffer supply chain shocks and shortages, as well as reduce dependency on Asia, which is where 75% of chips are produced.
- Two of the world's largest chipmakers, US-based Intel and Taiwan-based TSMC, plan to build new [semiconductor factories](#) in the US. In 2020, [TSMC](#) announced it would be spending \$12 billion to build a factory in Arizona with expected production to start in 2024. [Intel](#) then announced its plan to build two of fabs in Arizona and upgrade another in New Mexico (cumulatively spending \$23.5 billion) expected to be operational in 2023. Intel intends for these factories to be a US and Europe alternative to Asian chip factories and broke ground on the Arizona plant in [September 2021](#).

What does the future look like?

Lower the risk.

- Get ahead of the game. Forecast out 1-2 years.
- For now, no more “just in time”.
- No parts are secured unless they are in your building.
- Use sites like Z2 Data.
- Educate everyone involved.
- Be prepared financially.
- Redesign is getting very hard.

Thank you.

- Look us up at www.simmselectronics.com