INCREASING CHIP PRODUCTION
INDUSTRY SHOULDERING IN TO ADDRESS SHORTAGES

Packed with up to tens of billions of transistors on a piece of real estate the size of a quarter, semiconductors are perhaps the world’s most complex, costly, and research-intensive product humankind has every manufactured. Global demand for semiconductors is at an all-time high, and global chip shortages have impacted a range of industries. The semiconductor industry has taken extraordinary measures to address the shortage in the short, medium, and long term.

THE SHORT TERM: UTILIZE ALL THE CURRENT CAPACITY AVAILABLE

Building a new semiconductor fab takes 18-24 months on average. To increase chip production in the short term, fab capacity utilization needs to increase, and this is what the industry has been doing. Since the first quarter of 2019, quarterly fab capacity utilization has run well above the “full” rate, and in recent quarters it has been over 95%, which is unsustainable.

This increased utilization has resulted in:

Ramped Up Wafer Starts:
Since 1Q2020, global fab capacity has increased by over 2 million wafer starts per month, or by over 8%, and it is estimated to grow to close to 4 million wafer starts per month by the end of next year, or by over 16%.

Record Chip Sales:
There were more semiconductor units sold in 2Q2021 than during any other quarter in history. In fact, four of the six months during the first half of 2021 have set new records for monthly semiconductor units sold. June 2021 unit sales were the highest ever at almost 100 billion. And over 1 trillion semiconductors will be sold in 2021, which will be the highest total on record.

Record Auto Chip Sales:
For every month from September 2020 through July 2021, the monthly total of automotive application-specific semiconductors sold has surpassed the previous record total set in September 2018.
THE MEDIUM TERM: COMPLETE CURRENT CONSTRUCTION AND RAMP UP NEW FAB OUTPUT

For fab projects that are under construction or recently finished, the industry’s goal has been to get them completed and ramped up to full capacity as quickly as possible.

New Fab Construction:
In 2021, the global semiconductor industry is on target to bring online 26 new fabs globally (3 in the United States), with another 26 fabs under construction (4 in the U.S.).

THE LONG TERM: INCREASE CAPITAL SPENDING

For increasing production two and more years out, a good indicator the industry is taking steps to do that is through capital spending rates (capex). Starting in 2021, there is clearly a trend toward increased and sustained levels of capex.

Record Capital Spending:
Global semiconductor industry capex in 2021 is forecast to reach its highest level on record at $148 billion and to grow by 30% compared to 2020 spending levels. And the amount of annual industry capex projected over the next five years represents a significant jump from previous annual levels. Annual spending rates are projected to average $156 billion from 2021-2025, while the annual average from 2016-2020 was $97 billion. This change represents an increase in capex growth of 61%.

Sources: SEMI Fab Forecast 2Q2021 Quarterly Update; IC Insights, the McClean Report 2021, Mid-Year Update; World Semiconductor Trade Statistics (WSTS) monthly Bluebook sales data; and SIA-derived estimates.