



Technology Analysis of Leading-Edge Semiconductor Manufacturing

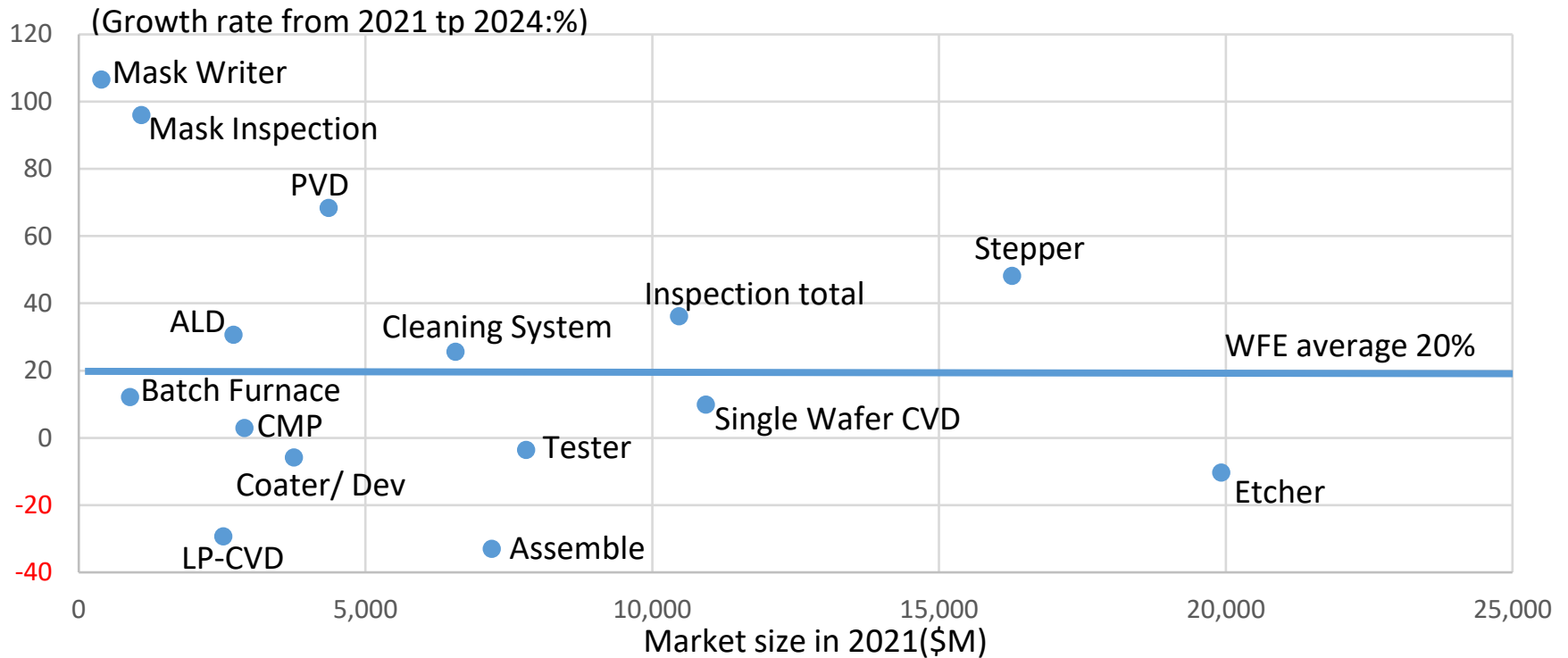
Tetsuya Wadaki
September 2025

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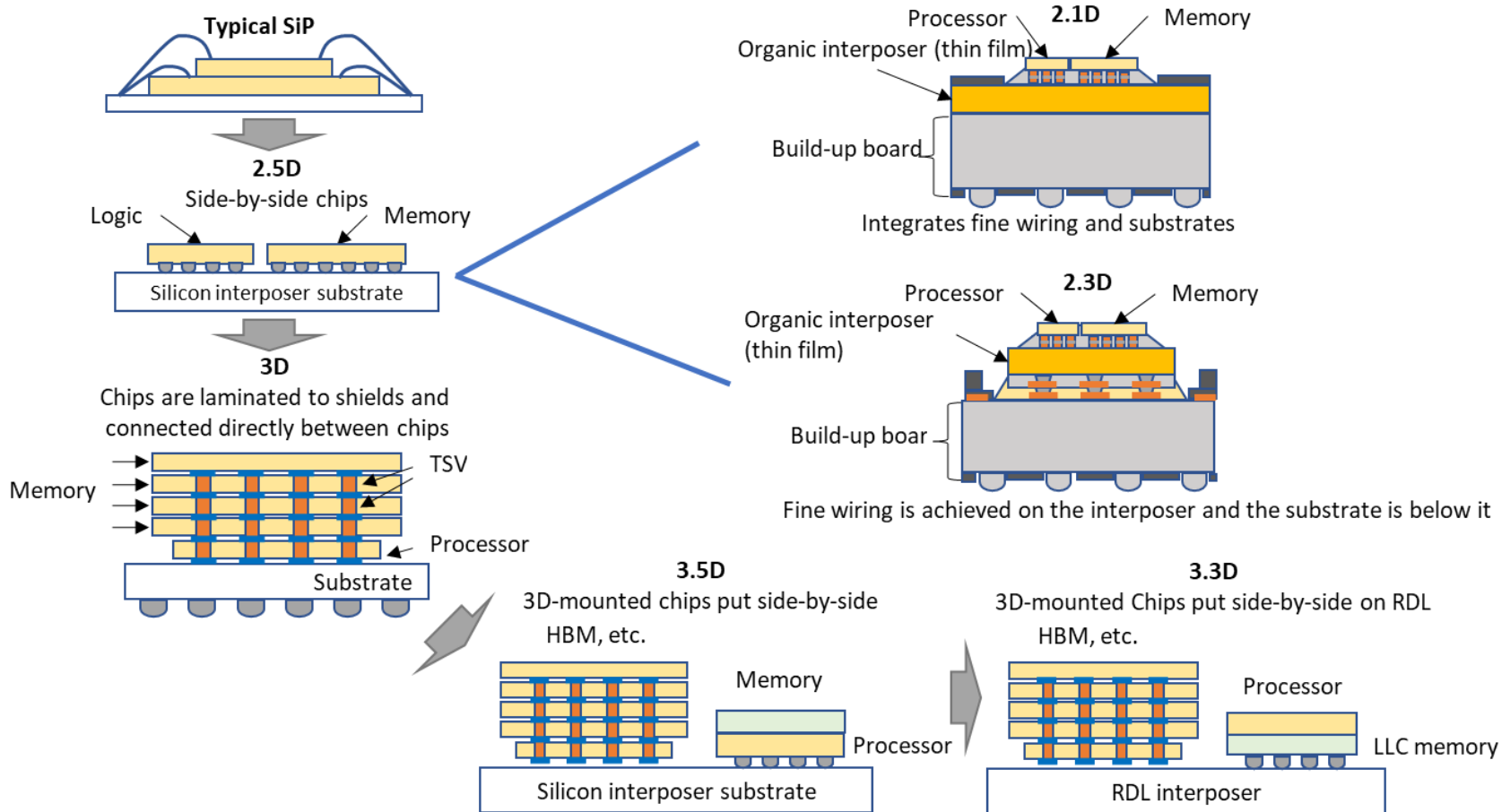
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2021–24 market growth rates for major SPE types

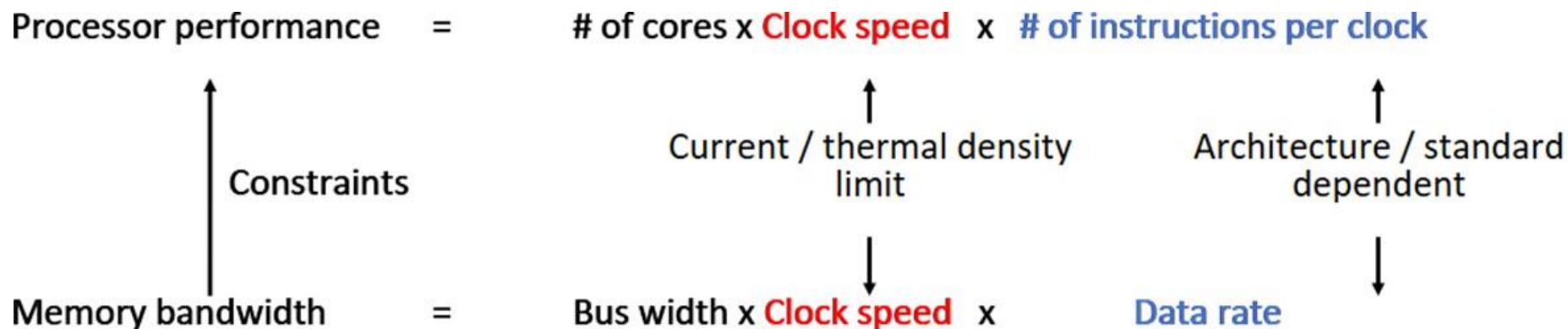


Source: Morgan Stanley Research based on SEMI Statistics

Variations of advanced packages

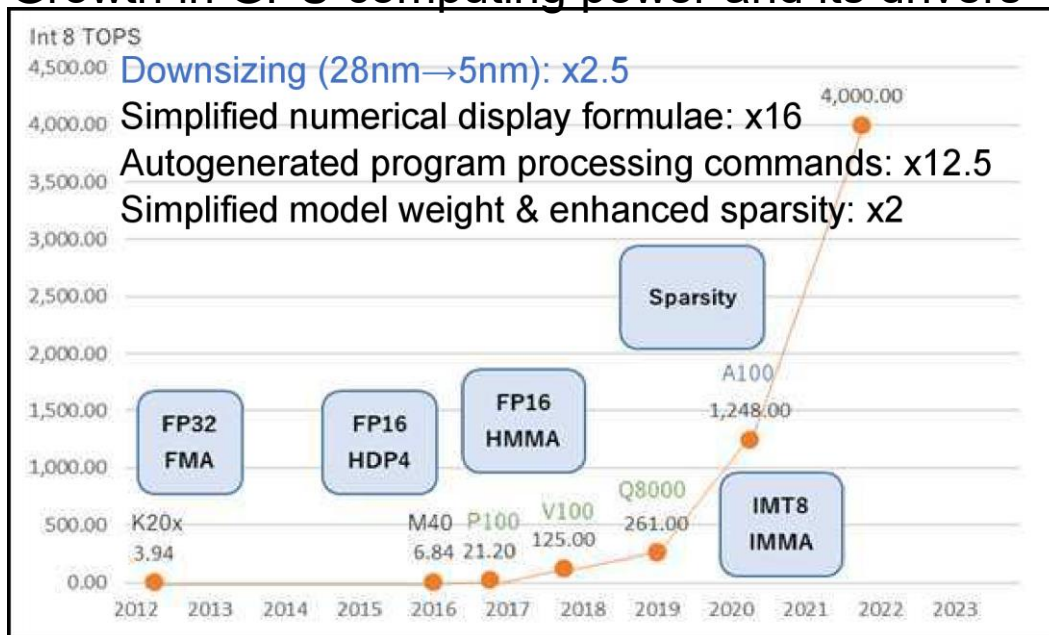


From Prof Phillip Wong's lecture on density as the key to advanced semiconductor performance



Source: Morgan Stanley Research

Growth in GPU computing power and its drivers



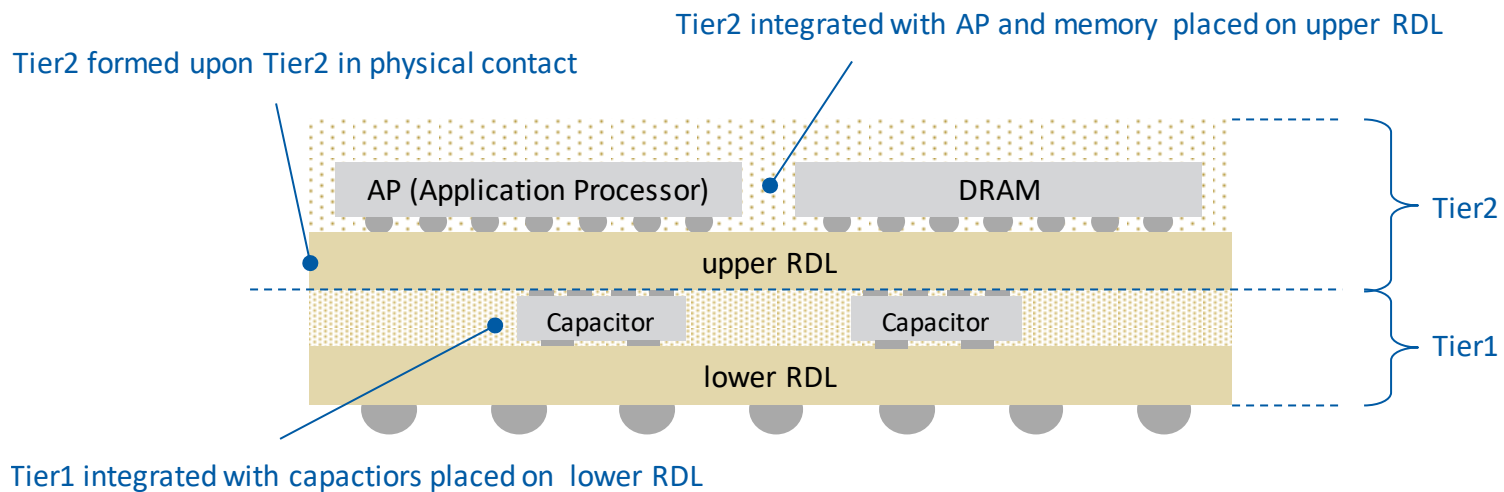
Source: Morgan Stanley Research based on Nvidia documents

Considering the benefits of GPUs for the semiconductor market

<div>Chips / Wafer</div> <div>Chips / User</div> <div>Number of users</div> <div>Wafer / Year</div> <div>Wafer/ Month</div>	<div>GPU for Generative AI</div> <div>18</div> <div>30,000/DC</div> <div>30</div> <div>50K</div> <div>4K</div>	<div>AP for iPhone</div> <div>300</div> <div>1/Phone</div> <div>227 million</div> <div>700K</div> <div>60K</div>
<div>Cores / Chip</div> <div>Yield</div> <div>Core numbers for test</div>	<div>GPU for Generative AI</div> <div>19,000</div> <div>20%</div> <div>85Billion</div>	<div>AP for iPhone</div> <div>11</div> <div>50%</div> <div>5Billion</div>

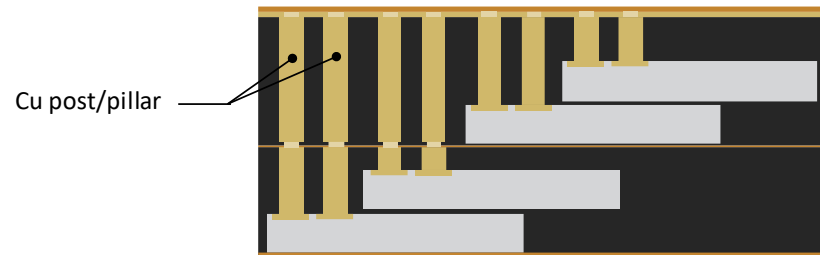
Source: Morgan Stanley Research

Expectation for foldable phones and estimated conceptual structure of WMCM



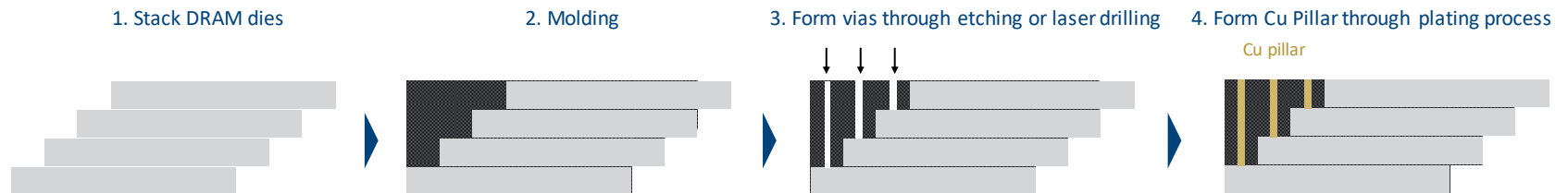
VCS (Vertical Cu post Stack) technology from Samsung Electronics

Cross-sectional illustration of VCS



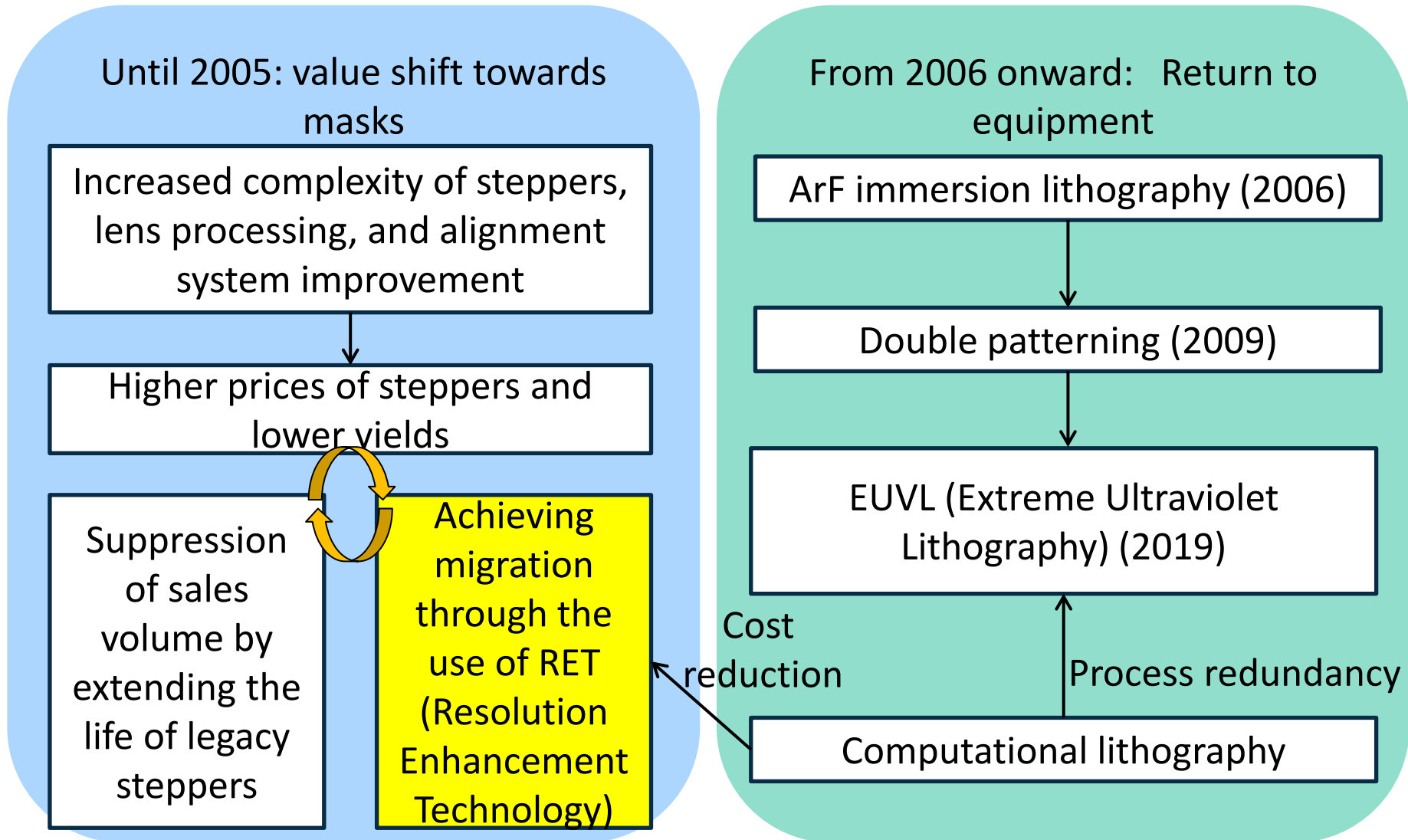
Source: Morgan Stanley Research

Manufacturing process of VCS

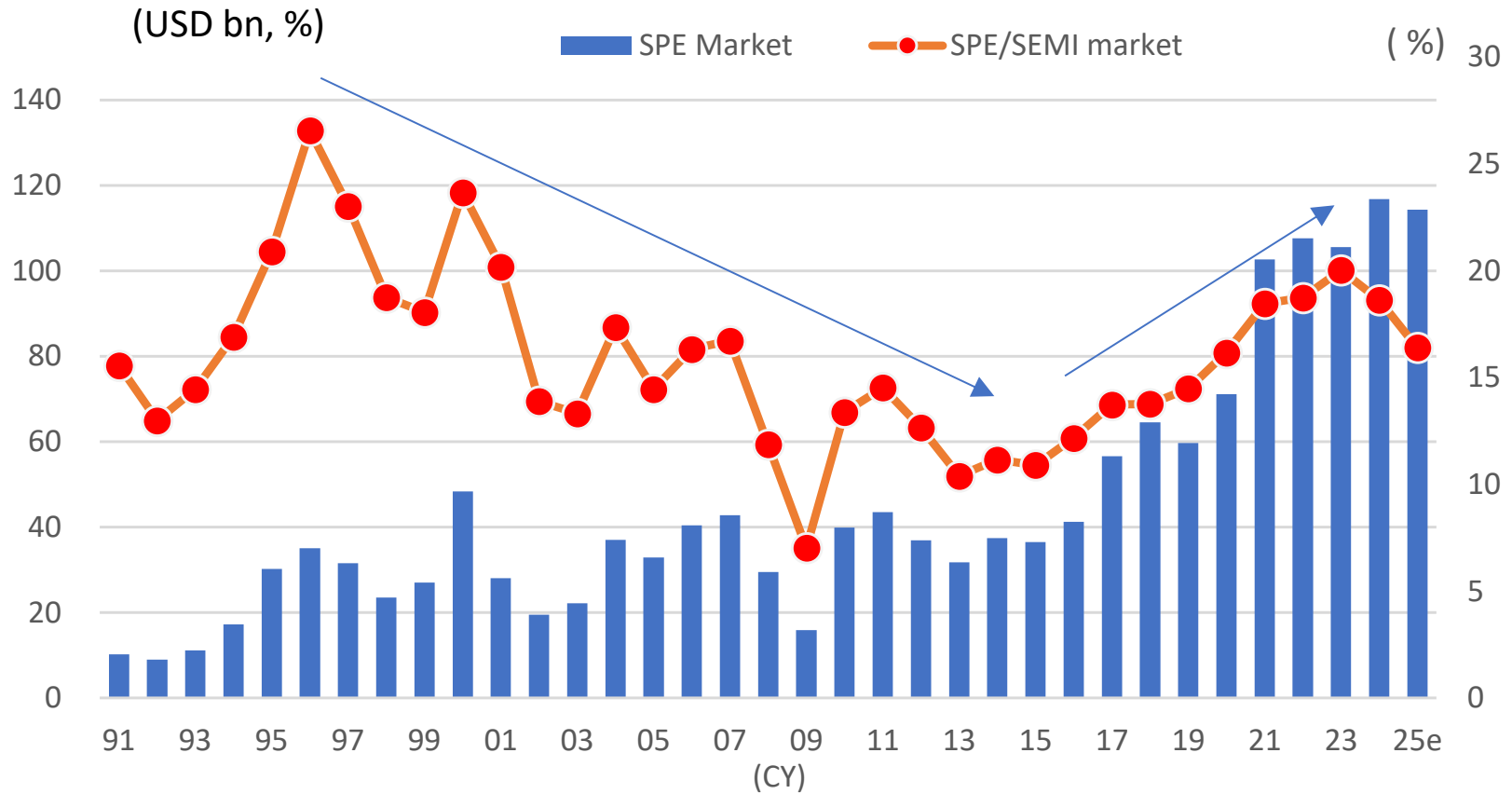


Source: ETnews, Morgan Stanley Research

Changes in the environment surrounding lithography

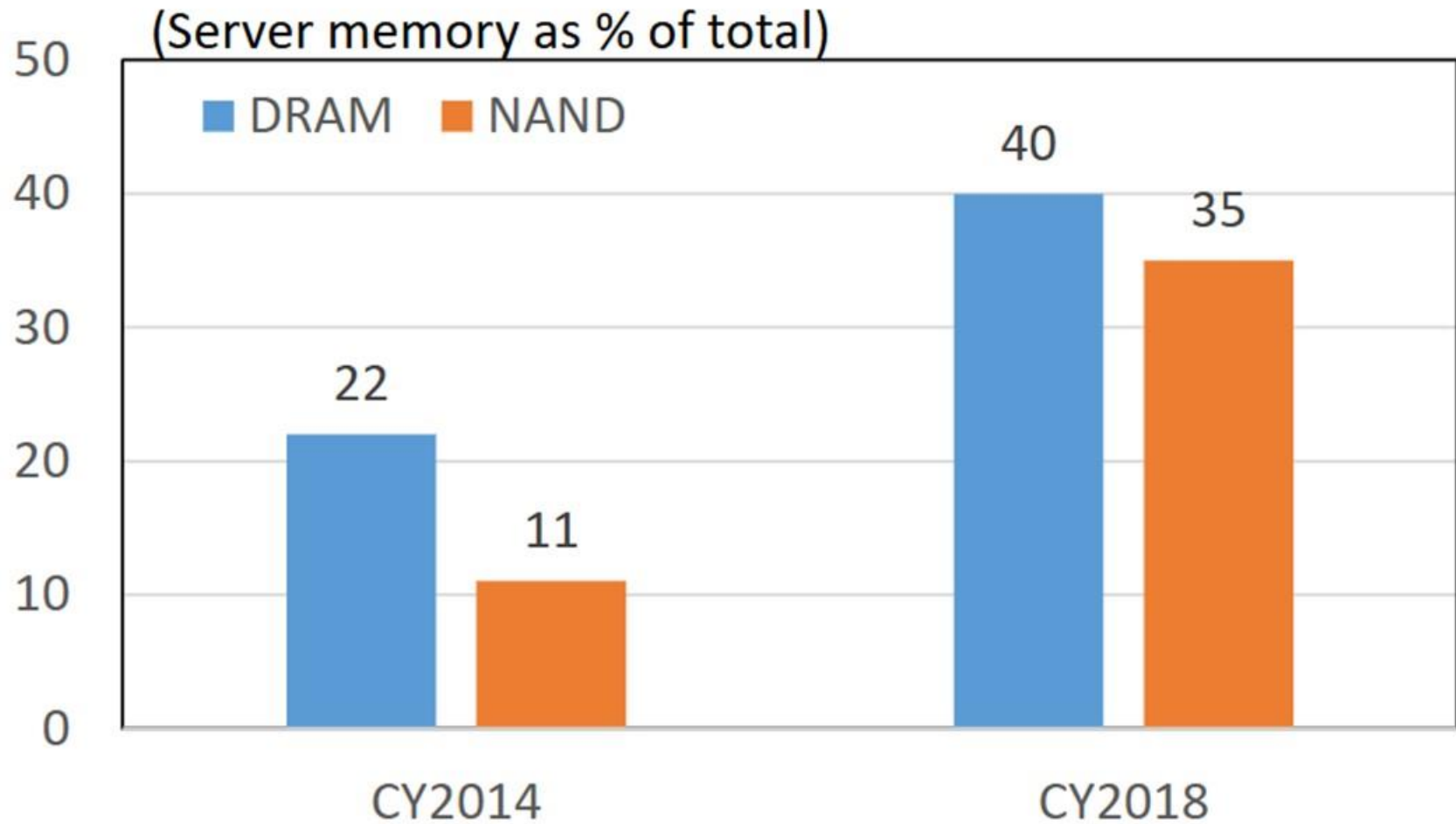


SPE Market Trend



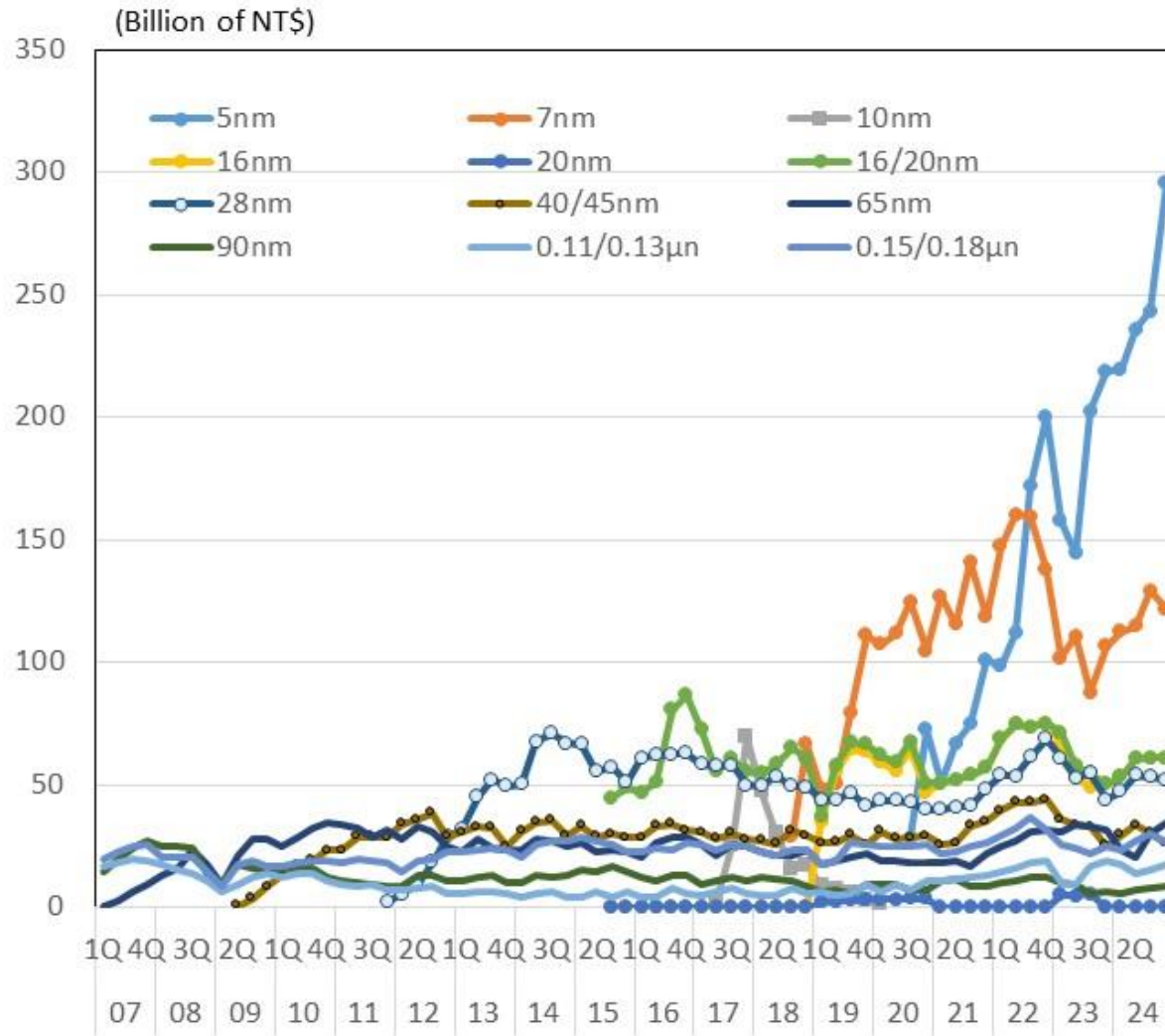
Source: SEMI, WSTS, Morgan Stanley Research estimates

First Super Cycle arrived: Feb 2016



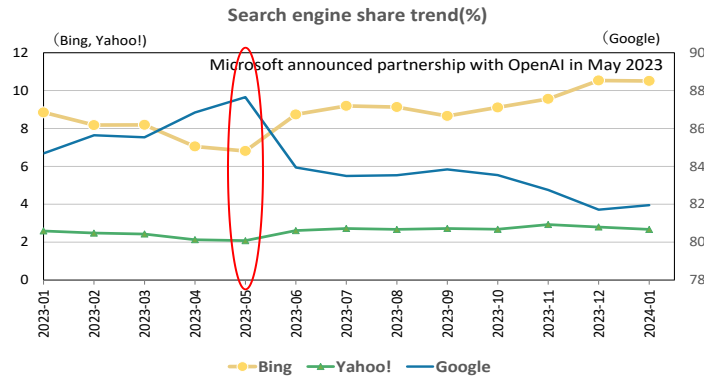
2nd Super Cycle Brought About by EUVL: April 2019

TSMC's sales by node

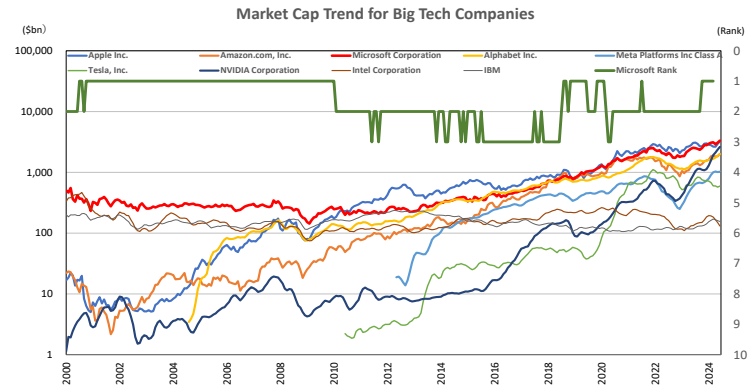


Source: Morgan Stanley Research, from TSMC results briefing materials

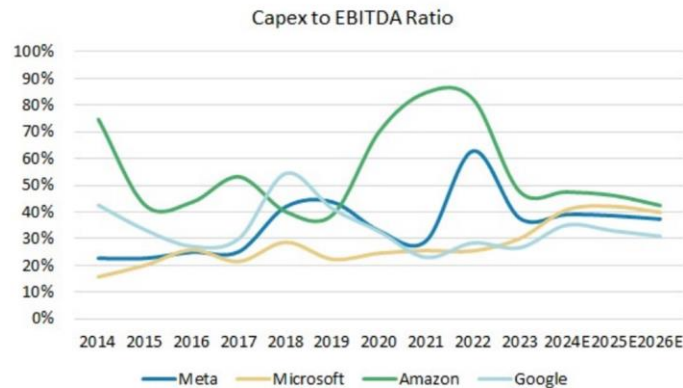
Sustainability of investment in generative AI



Source: FactSet, Morgan Stanley Research



Source: FactSet, Morgan Stanley Research



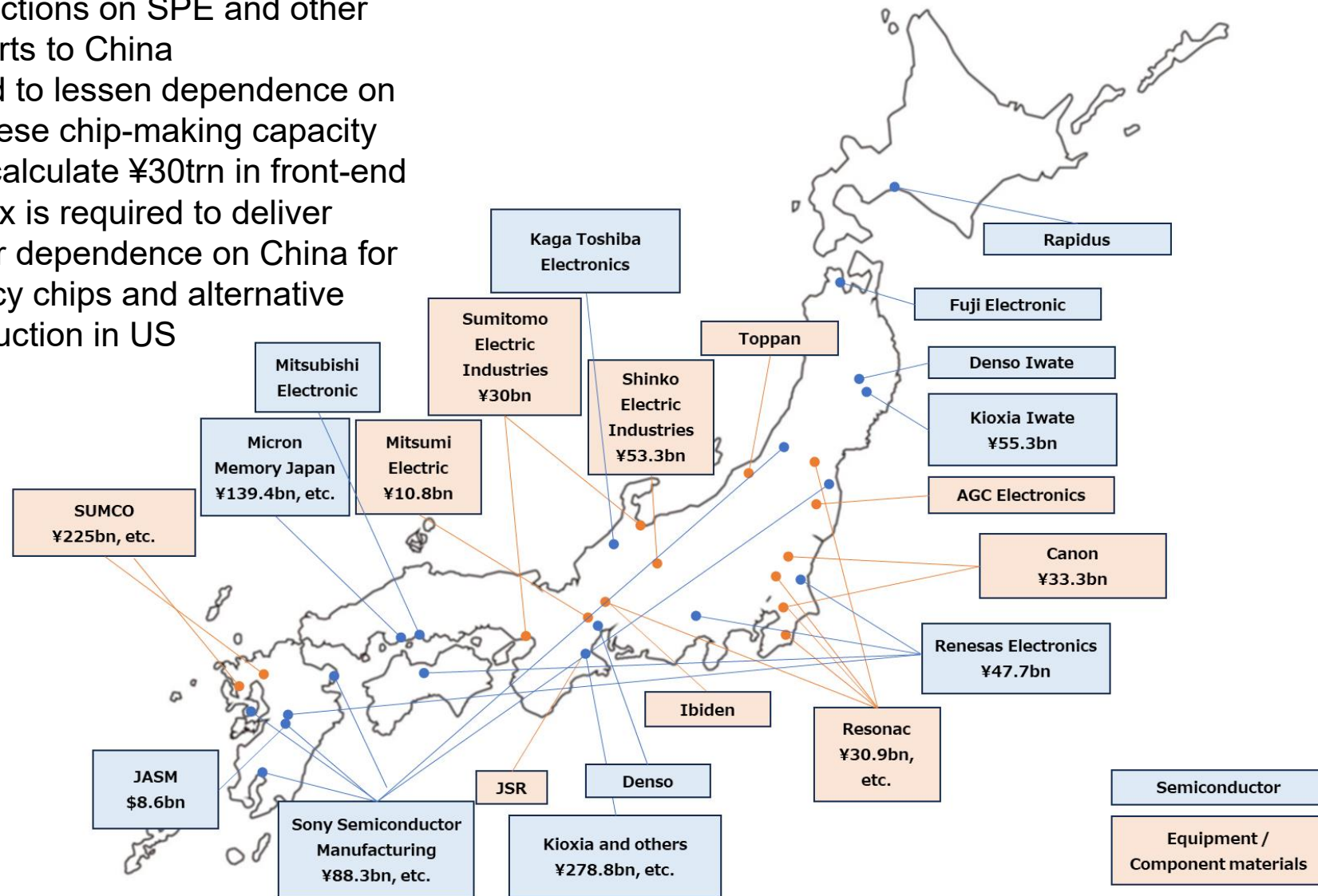
Source: Company data, Morgan Stanley Research; E = Morgan Stanley Research estimates



Source: Company data, Morgan Stanley Research; e = Morgan Stanley Research estimates

Large-scale domestic investment projects (semiconductor-related) that are moving forward with the support of the government

- The US has continued to bolster restrictions on SPE and other exports to China
- Need to lessen dependence on Chinese chip-making capacity
- We calculate ¥30trn in front-end capex is required to deliver lower dependence on China for legacy chips and alternative production in US



Note: These show large projects included in the budget plan (including total amounts where they have been announced)
Source : Morgan Stanley Research based on METI data

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	Count	% of Total	Count	% of Total IBC	% of Rating Category	Count	% of Total Other MISC
Overweight/Buy	1499	41%	386	46%	26%	699	41%
Equal-weight/Hold	1618	44%	375	44%	23%	778	45%
Not-Rated/Hold	3	0%	0	0%	0%	1	0%
Underweight/Sell	581	16%	86	10%	15%	234	14%
Total	3,701		847			1712	

Data include common stock and ADRs currently assigned ratings. Investment Banking Clients are companies from whom Morgan Stanley received investment banking compensation in the last 12 months. Due to rounding off of decimals, the percentages provided in the "% of total" column may not add up to exactly 100 percent.

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COMPANY (TICKER)	RATING (AS OF)	PRICE* (09/18/2025)
Suzune Tamura, CFA		
JEOL (6951.T)	E (07/08/2025)	¥4,881
Tetsuya Wadaki		
Advantest (6857.T)	O (01/17/2024)	¥14,530
DISCO (6146.T)	O (07/07/2023)	¥47,610
KOKUSAI ELECTRIC (6525.T)	E (04/11/2024)	¥4,056
Lasertec (6920.T)	U (07/28/2025)	¥17,055
Nikon (7731.T)	U (08/08/2023)	¥1,761
SCREEN Holdings (7735.T)	O (02/25/2025)	¥13,255
Tokyo Electron (8035.T)	E (02/25/2025)	¥25,455
Ulvac (6728.T)	E (01/17/2024)	¥6,682
Ushio (6925.T)	E (01/17/2024)	¥2,257

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