

Electronics Components Industry Outlook

ERA Live

June 20, 2023



Agenda

- Edgewater Introduction
- Where are we in the Cycle?
- Disruption & Industry Outlook
- Supply Side Fundamental Review & Outlook
- End Demand Fundamental Review & Outlook
- Edgewater Research's Industry Sales Forecast

About Edgewater

Who is Edgewater Research?

- An **Independent Research Company** specializing in Technology, Internet & Consumer/Ecommerce
- We service many of the **largest money managers** in the world who invest in technology companies
- We provide **critical business insights** into complex and dynamic industries through **fundamental research**
- **Our reputation dates back two decades** of providing trusted, timely, and unbiased research to the clients we serve

Why Edgewater?

What We Are

- **Deeply connected in the industry**, on a worldwide basis, from foundry to supplier to distributor to end customer; contacts across purchasing/strategy/business development
- A **trusted resource** for the investment community, who provides access to capital and **invests public & private growth opportunities**
- A **critical partner** with the largest global technology companies, assisting in **identifying key trends and assist in shaping a strategy** to address those opportunities

Partnering with Edgewater Research

Channel Confidant

Like Channel Partners, we exchange information with a wider group of experts who also subscribe to our research product. Channel Confidants receive discounted rates for research access as long as the information barter stays valuable and consistent over time.

Channel Subscriber

Subscribers prefer to receive the research without exchanging in information. Subscription pricing is available for a variety of industry verticals and related reports.

Speaker Background & Contact Information



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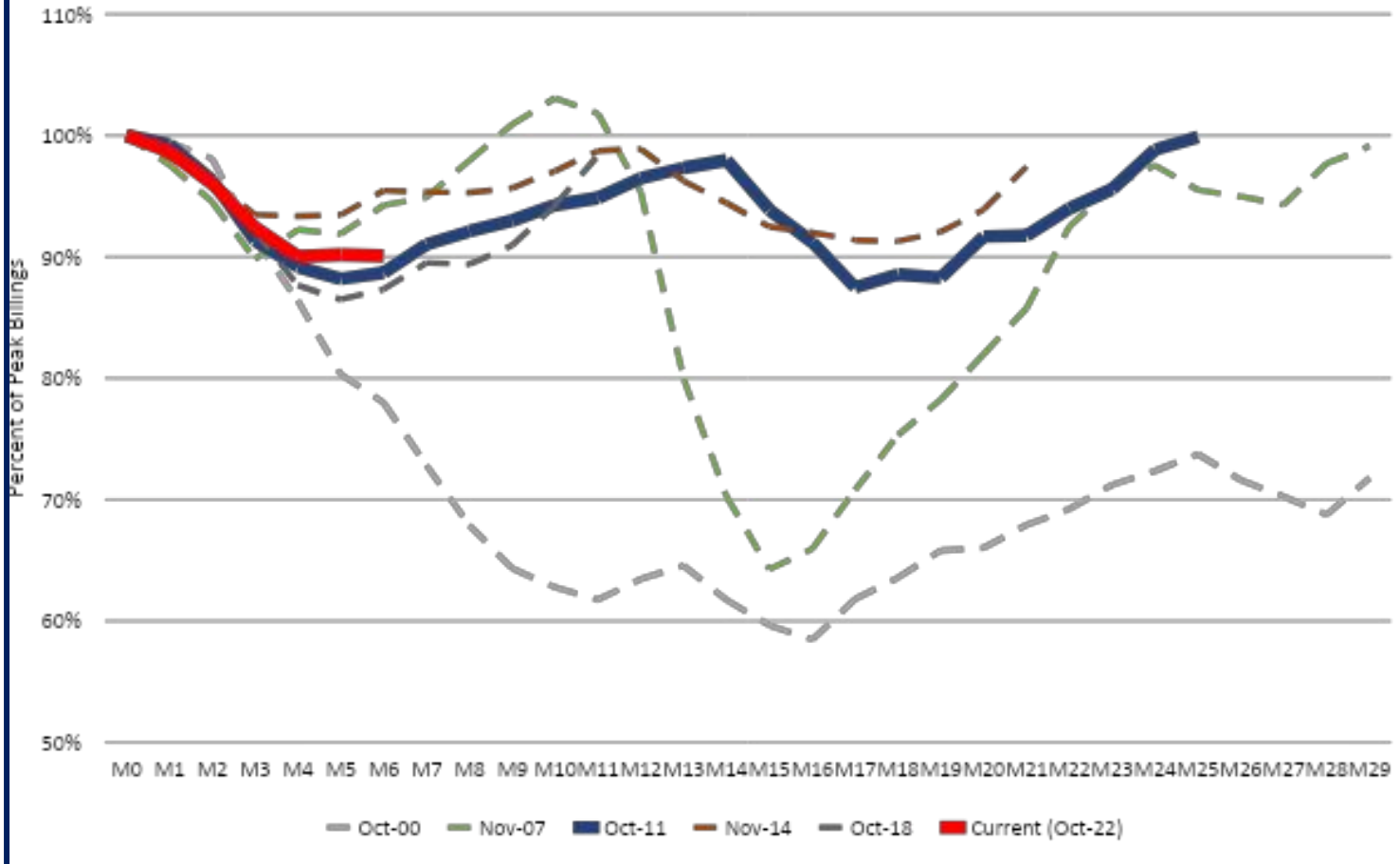


- Started as Research Analyst in Technology in 2005 and **has over 10 years of experience** in semiconductors, memory, storage, and distribution with several respected firms including Edgewater Research.
- Developed an extensive network of technology industry professionals throughout the world and is a **trusted resource to his contacts and clients alike.**
- Worked in several roles of increasing responsibility in **strategy, product development, sales management & field sales at Travelers Insurance.**
- A 2002 graduate from Ohio University with a B.S. in Sports Administration

How Does the Current Down Cycle Compare?

Downturn has most closely mirrored 2011... 2011 correction lasted 25 months

**Semis Downcycles (ex-memory)
(months post peak billings)**



Major Peak-to-trough	
Oct-00	-41.5%
Nov-07	-36.0%
Oct-11	-12.0%
Nov-14	-5.6%
Oct-18	-13.5%

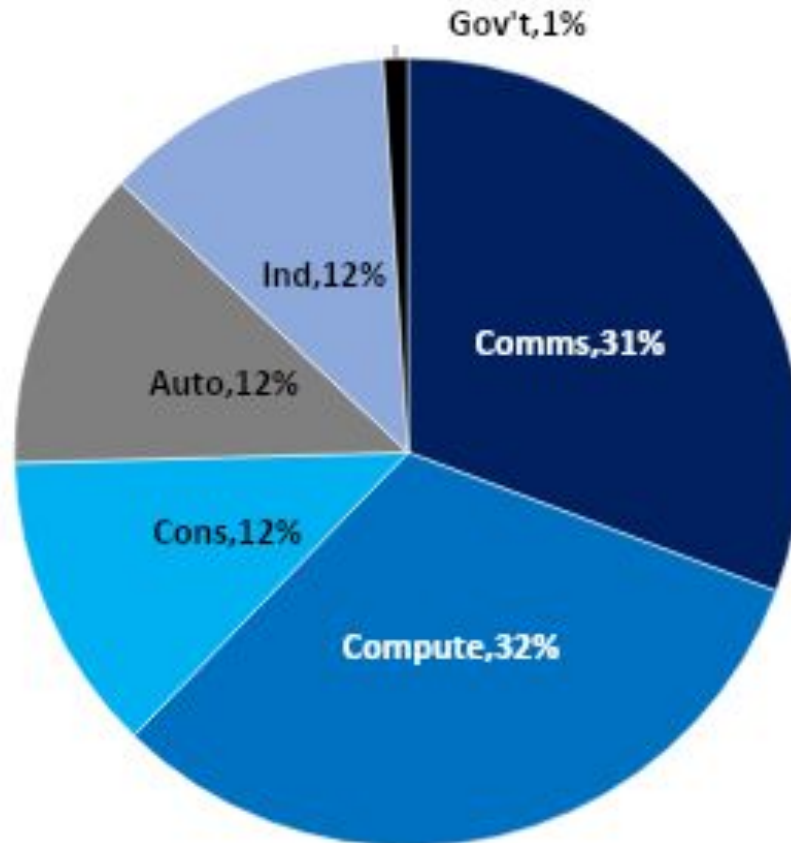
Median Cycle Timing Data	
Median peak to trough (M)	8
Median peak to through (%)	-13.5%
Median months to new high	23

Source: SIA, Edgewater Research

SIA Revenues by End Markets

Aerospace, Defense, & Auto likely only growth markets in 2023

2021 Global Semiconductor Demand by End Use



Source: SIA

WSTS Annual Sales 2014 – 2023E

Returning to more normalized growth rates/declines following 2 years of above market growth

WSTS Annual Sales 2014 – 2023E

Returning to more normalized growth rates/declines following 2 years of above market growth

	2014	2015	2016	2017	2018	2019	2020	2021	2022E	2023E	2014-2019 CAGR	2014-2023E CAGR	2020-2023 CAGR
Americas	\$69,324	\$68,738	\$65,537	\$86,458	\$102,997	\$78,741	\$95,366	\$121,481	\$142,138	\$143,278	3%	8%	15%
Europe	\$37,459	\$34,258	\$32,707	\$38,048	\$42,957	\$41,609	\$37,520	\$47,757	\$53,774	\$54,006	2%	4%	13%
Japan	\$34,830	\$31,102	\$32,292	\$36,350	\$39,961	\$36,069	\$36,471	\$43,687	\$48,064	\$48,280	1%	4%	10%
APAC	\$194,230	\$201,070	\$208,395	\$247,834	\$282,863	\$255,666	\$271,032	\$342,967	\$336,151	\$311,005	6%	5%	5%
Total (\$M)	\$335,843	\$335,168	\$338,931	\$408,690	\$468,778	\$412,085	\$440,389	\$555,892	\$580,127	\$556,569	4%	6%	8%
Discrete Semis	\$20,170	\$18,612	\$19,418	\$21,498	\$24,102	\$24,450	\$23,804	\$30,337	\$34,058	\$35,060	4%	6%	14%
Optoelectronics	\$29,868	\$33,256	\$31,994	\$34,467	\$38,032	\$37,474	\$40,397	\$43,404	\$43,777	\$45,381	5%	5%	4%
Sensors	\$8,502	\$8,816	\$10,821	\$12,537	\$13,356	\$13,295	\$14,962	\$19,149	\$22,262	\$23,086	9%	12%	16%
Integrated Circuits	\$277,302	\$274,484	\$276,698	\$340,189	\$393,288	\$336,867	\$361,226	\$463,002	\$479,988	\$453,041	4%	6%	8%
Analog	\$44,365	\$45,228	\$47,848	\$52,711	\$58,785	\$55,846	\$55,658	\$74,105	\$89,554	\$90,952	5%	8%	18%
Micro	\$62,072	\$61,298	\$60,585	\$63,147	\$67,233	\$66,519	\$68,678	\$80,221	\$78,790	\$75,273	1%	2%	3%
Logic	\$91,633	\$90,753	\$91,498	\$101,413	\$109,303	\$104,912	\$118,408	\$154,837	\$177,238	\$175,191	3%	7%	14%
Memory	\$79,232	\$77,205	\$76,767	\$122,918	\$157,967	\$109,990	\$117,482	\$155,458	\$134,407	\$111,624	7%	4%	-2%
Total (\$M)	\$335,842	\$335,168	\$338,931	\$408,691	\$468,778	\$412,086	\$440,389	\$555,892	\$580,125	\$556,568	4%	6%	8%
Total (ex-Memory)	\$256,610	\$257,963	\$262,164	\$285,773	\$310,811	\$302,496	\$322,907	\$400,434	\$445,718	\$444,944	3%	6%	11%

Y/Y	2014	2015	2016	2017	2018	2019	2020	2021	2022E	2023E
Americas		-0.8%	-4.7%	31.9%	19.1%	-23.6%	21.1%	27.4%	17.0%	0.8%
Europe		-8.5%	-4.5%	16.3%	12.9%	-3.1%	-9.8%	27.3%	12.6%	0.4%
Japan		-10.7%	3.8%	12.6%	9.9%	-9.7%	1.1%	19.8%	10.0%	0.4%
APAC		3.5%	3.6%	18.9%	14.1%	-9.6%	6.9%	26.5%	-2.0%	-7.5%
Total		-0.2%	1.1%	20.6%	14.7%	-12.1%	6.9%	26.2%	4.4%	-4.1%
Discrete Semis		-7.7%	4.3%	10.7%	12.1%	1.4%	-2.6%	27.4%	12.4%	2.8%
Optoelectronics		11.3%	-3.8%	7.7%	10.3%	-1.5%	7.8%	7.4%	0.9%	3.7%
Sensors		3.7%	22.7%	15.9%	6.5%	-0.5%	12.5%	28.0%	16.3%	3.7%
Integrated Circuits		-1.0%	0.8%	22.9%	15.6%	-14.3%	7.2%	28.2%	3.7%	-5.6%
Analog		1.9%	5.8%	10.2%	11.5%	-5.0%	-0.3%	33.1%	20.8%	1.6%
Micro		-1.2%	-1.2%	4.2%	6.5%	-1.1%	4.7%	15.1%	-1.8%	-4.5%
Logic		-1.0%	0.8%	10.8%	7.8%	-4.0%	12.9%	30.8%	14.5%	-1.2%
Memory		-2.6%	-0.6%	60.1%	28.5%	-30.6%	7.2%	32.3%	-13.5%	-17.0%
Total		-0.2%	1.1%	20.6%	14.7%	-12.1%	6.9%	26.2%	4.4%	-4.1%
Total (ex-Memory)		0.5%	1.6%	9.0%	8.8%	-2.7%	6.7%	24.0%	11.3%	-0.2%



Source: WSTS

Do We Have a Banking Crisis?

Supply Chain more normal, banking issues worrisome, minimal impact thus far

Supply Chain Disruption Review

Supply chain overcame unprecedented levels of disruptions

- **Geopolitical disruptions:** late 2019/2020 US & China trade war, Huawei & SMIC disruption, Russia/Ukraine conflict
- **Natural Disasters:** AKM factory fire, UMC factory fire, Micron power outage, Winter Storm Uri (aka Texas Deep Freeze), Renesas factory fire, PANJIT factory fire, WD/Kioxia contamination
- **Covid Outbreaks:** Emergence of Delta variant in SE Asia, Covid shutdowns Malaysia, Vietnam, Thailand, etc.
- **Port Congestion:** Suez Canal, container shortages, port disruptions, Covid outbreaks
- **Material Shortages:** Foundry capacity, lead frames, packaging & test capacity, water shortages in Taiwan



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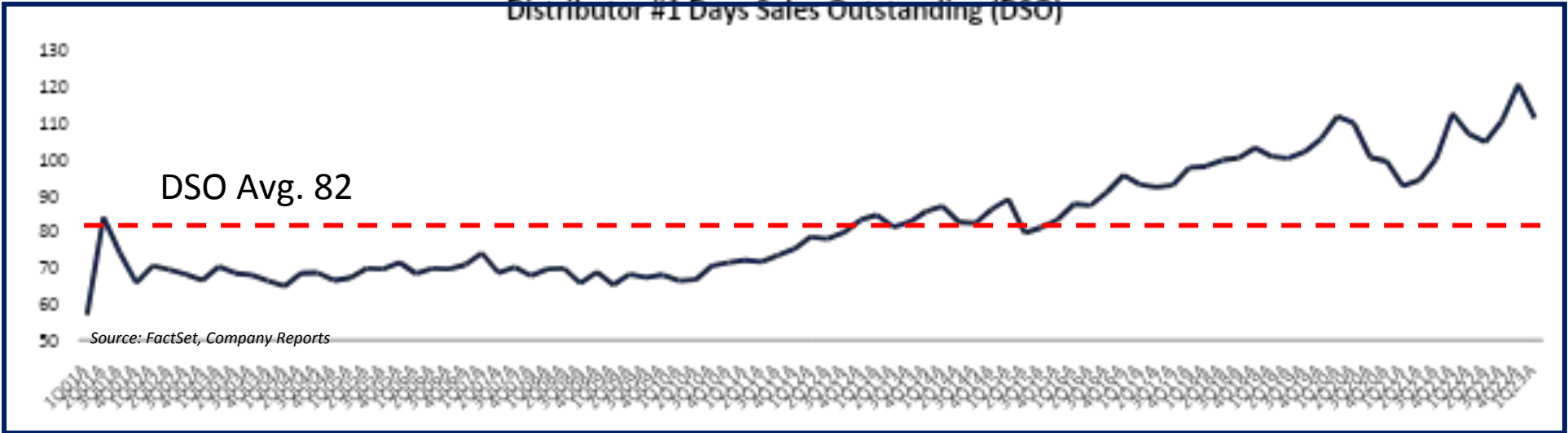


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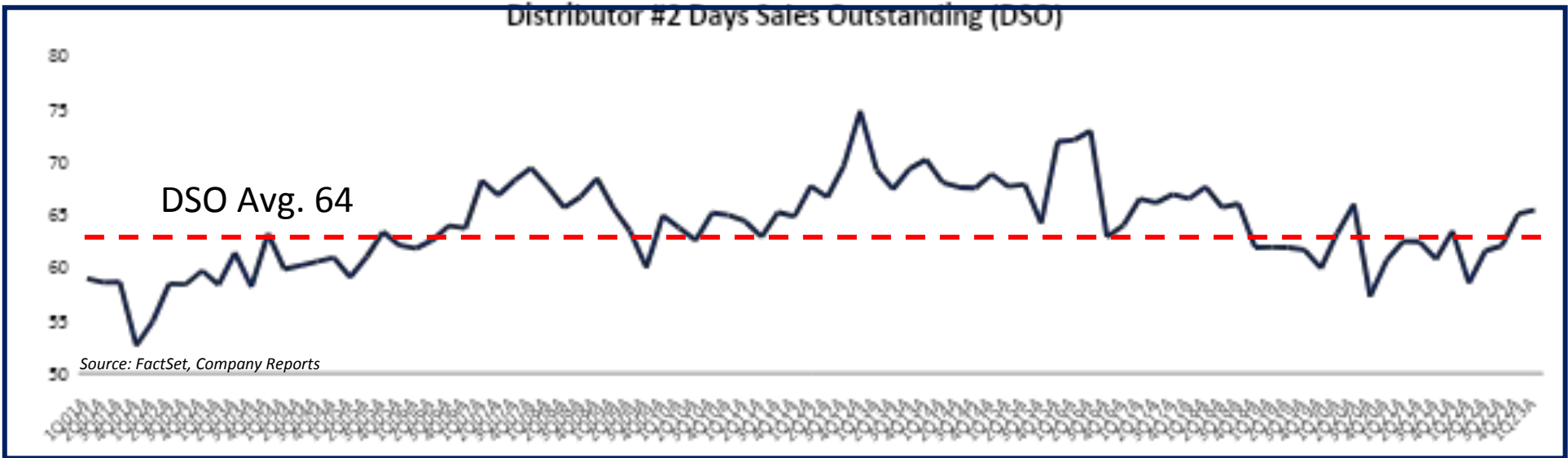
Days Sales Outstanding (DSOs) Above Long-term Trends

DSO levels are concerning as credit conditions are tight and borrowing costs rise

Distributor #1 Days Sales Outstanding (DSO)



Distributor #2 Days Sales Outstanding (DSO)

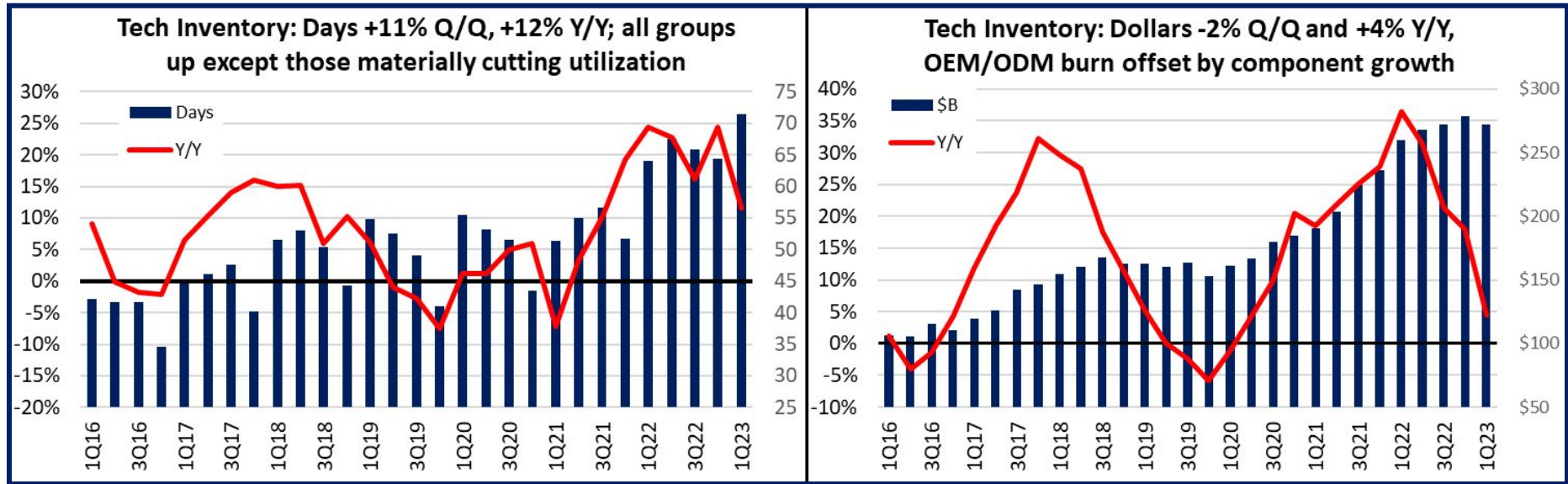


Tech Supply Chain Inventory Levels Replenished

Inventory dollars and days well above pre-Covid levels, burning inventory remains a focus

Inventory - Some progress as OEM/ODM reductions offsetting component/channel growth

	Dollars (\$B)				Days				Dollars Change			Days Change		
	1Q19	1Q22	4Q22	1Q23	1Q19	1Q22	4Q22	1Q23	vs. 1Q19	Q/Q	Y/Y	vs. 1Q19	Q/Q	Y/Y
Total	\$162.5	\$260.1	\$278.4	\$271.8	55	64	64	71	67%	-2%	4%	30%	11%	12%
Analog/Passive	\$19.3	\$28.5	\$32.2	\$33.7	89	89	97	106	75%	5%	18%	20%	9%	19%
Compute Suppliers	\$51.5	\$75.9	\$89.1	\$90.1	93	98	127	126	75%	1%	19%	36%	-1%	29%
Comms Suppliers	\$5.1	\$11.9	\$14.3	\$14.1	69	87	117	119	178%	-2%	19%	73%	2%	37%
Distributors	\$11.3	\$15.4	\$17.7	\$18.0	53	47	56	64	59%	2%	17%	20%	13%	37%
ODM/EMS	\$46.3	\$76.2	\$76.8	\$69.5	53	65	58	64	50%	-10%	-9%	20%	9%	-2%
OEMs	\$29.1	\$52.3	\$48.3	\$46.4	28	39	31	36	60%	-4%	-11%	29%	15%	-8%

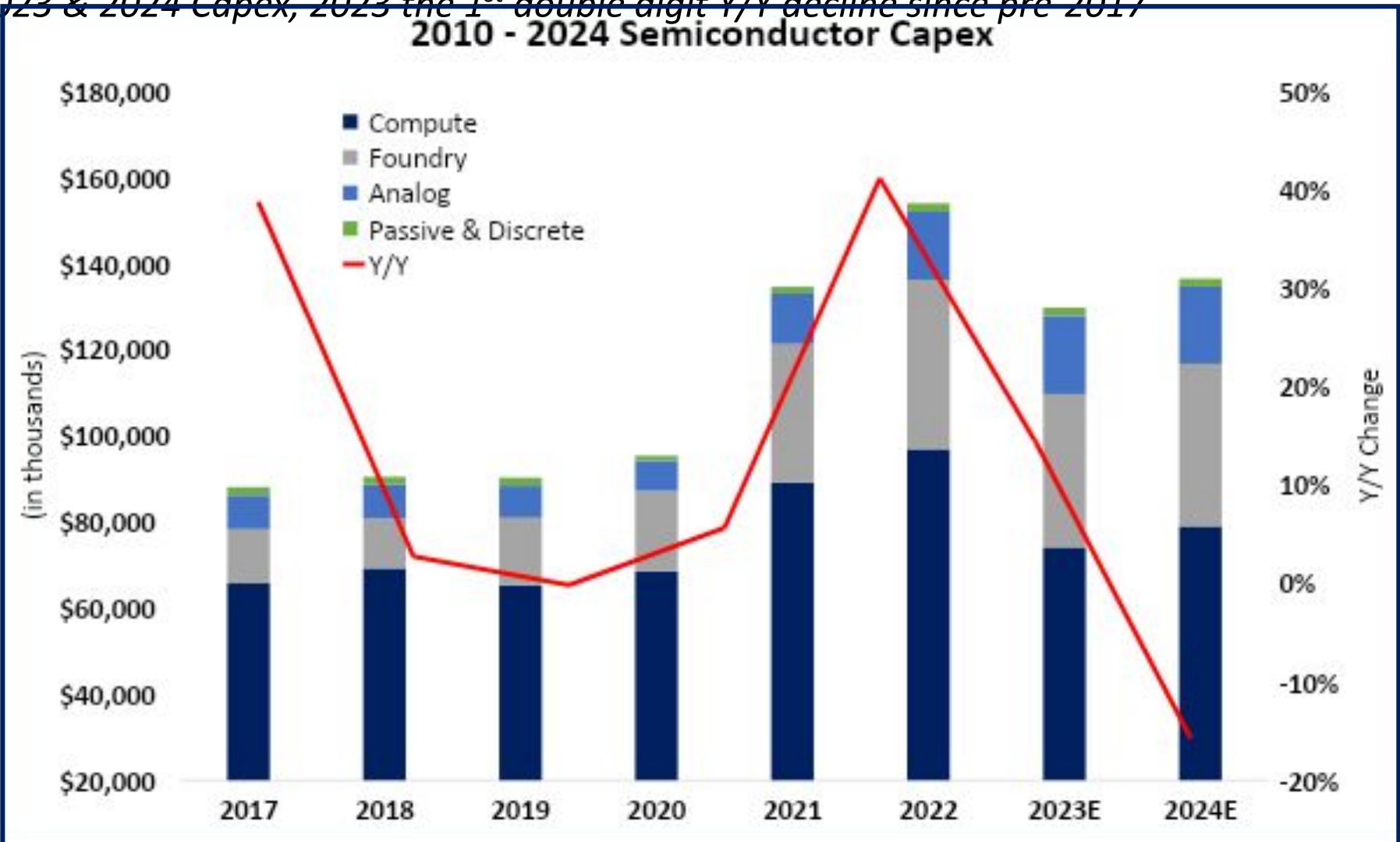


Source: FactSet, Company Reports

Capacity Additions are a Step Function, Keeping the industry Cyclical

~~2023 & 2024 Capex, 2023 the 1st double digit Y/Y decline since pre 2017~~

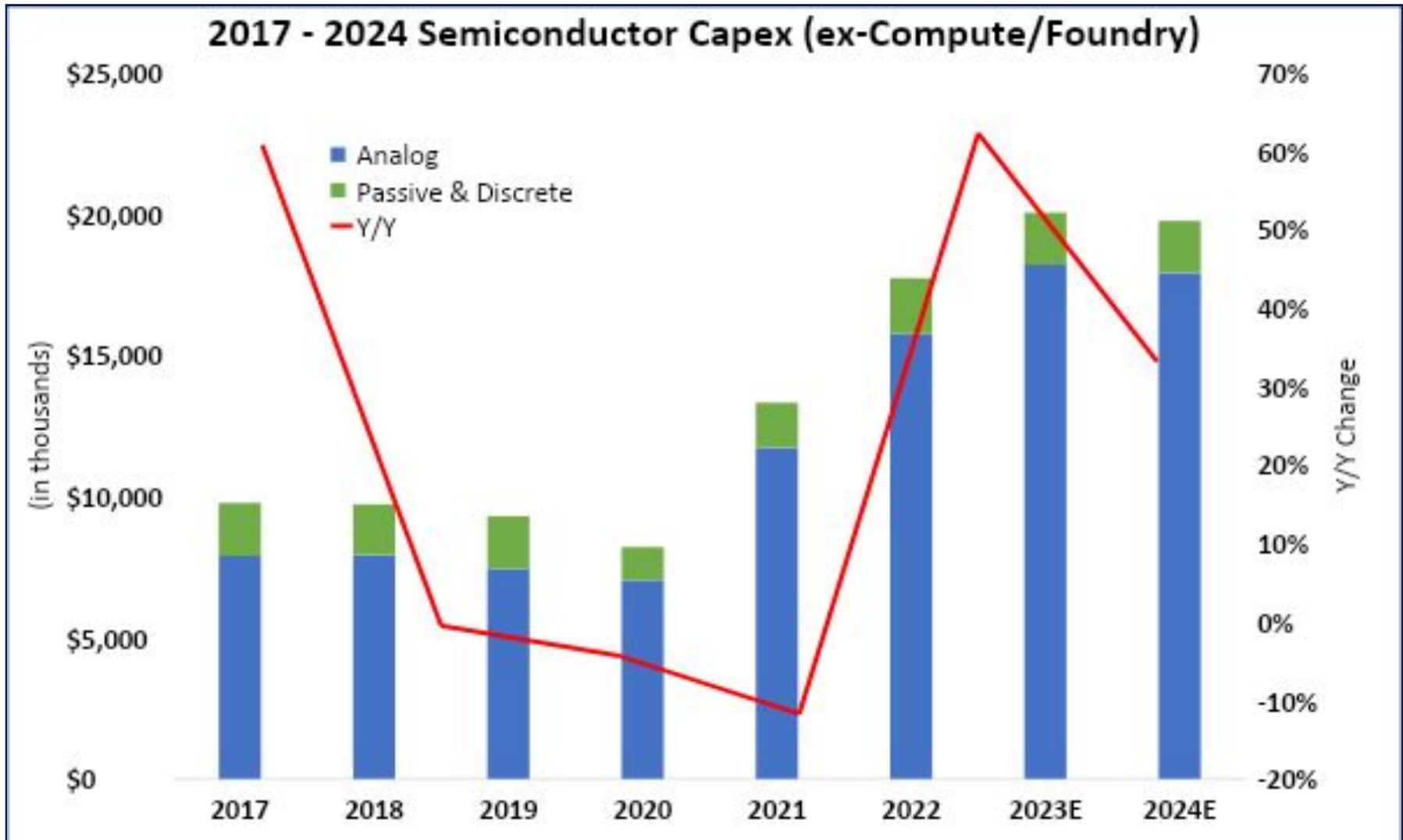
2010 - 2024 Semiconductor Capex



Source: Factset, Edgewater Research estimates

2023 High Performance Analog/Passive & Discrete Outlook

2023 & 2024 moderating, but still at record levels, largely driven by TI



Source: Factset, Edgewater Research estimates



2023 PC Outlook

PC industry shipped ~100 million “extra” units during Covid, implying more challenging rebound

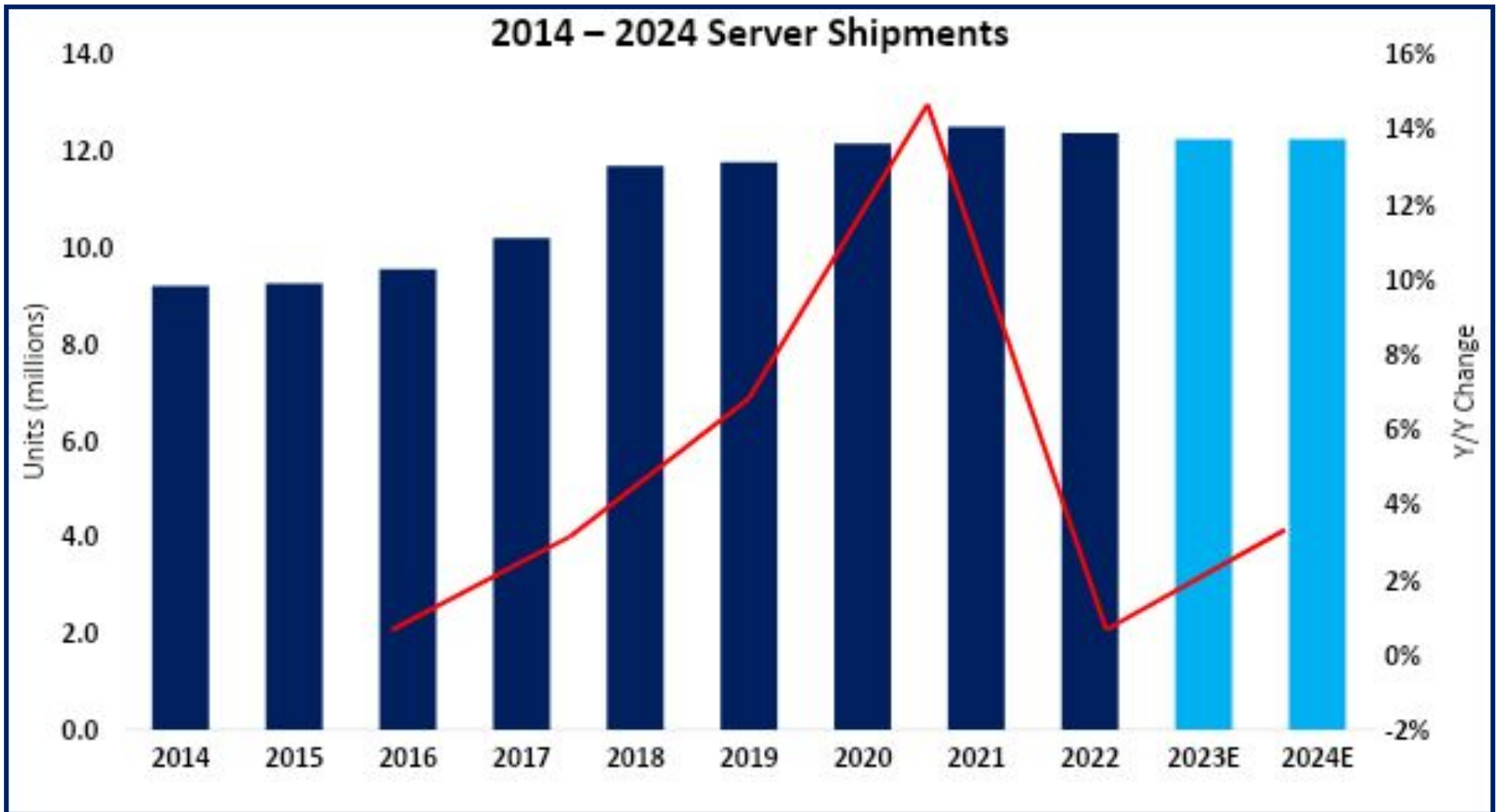
PC shipment CY23 TAM trimmed to ~250-260M or down ~10-15% Y/Y; CY24 PC shipments forecasted flattish Y/Y w/ limited visibility



Source: IDC, Edgewater Research estimates

2023 Server Outlook

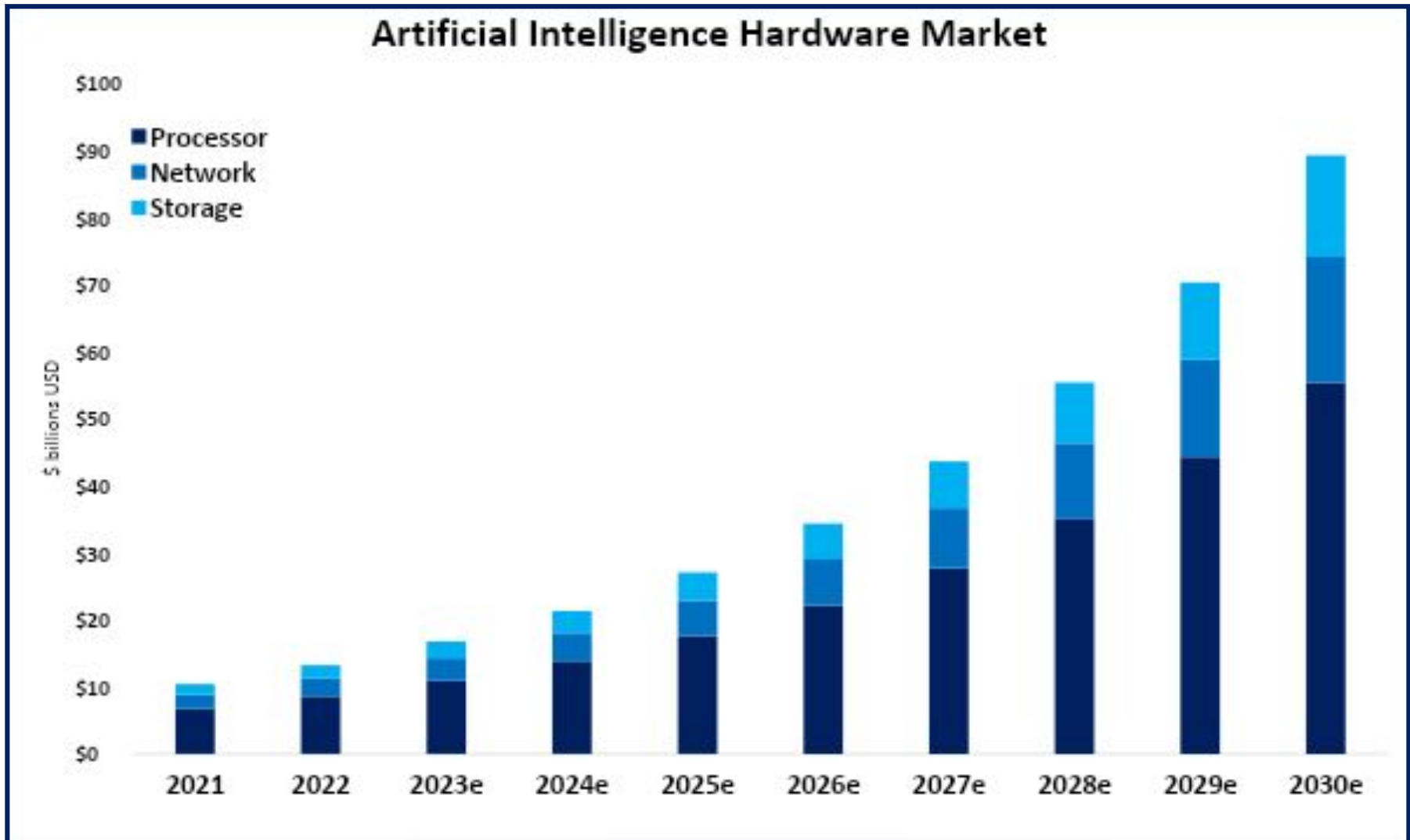
Hyperscale orders slowing on macro concerns, enterprise remains weak



Source: IDC, Edgewater Research estimates

The Rise of AI

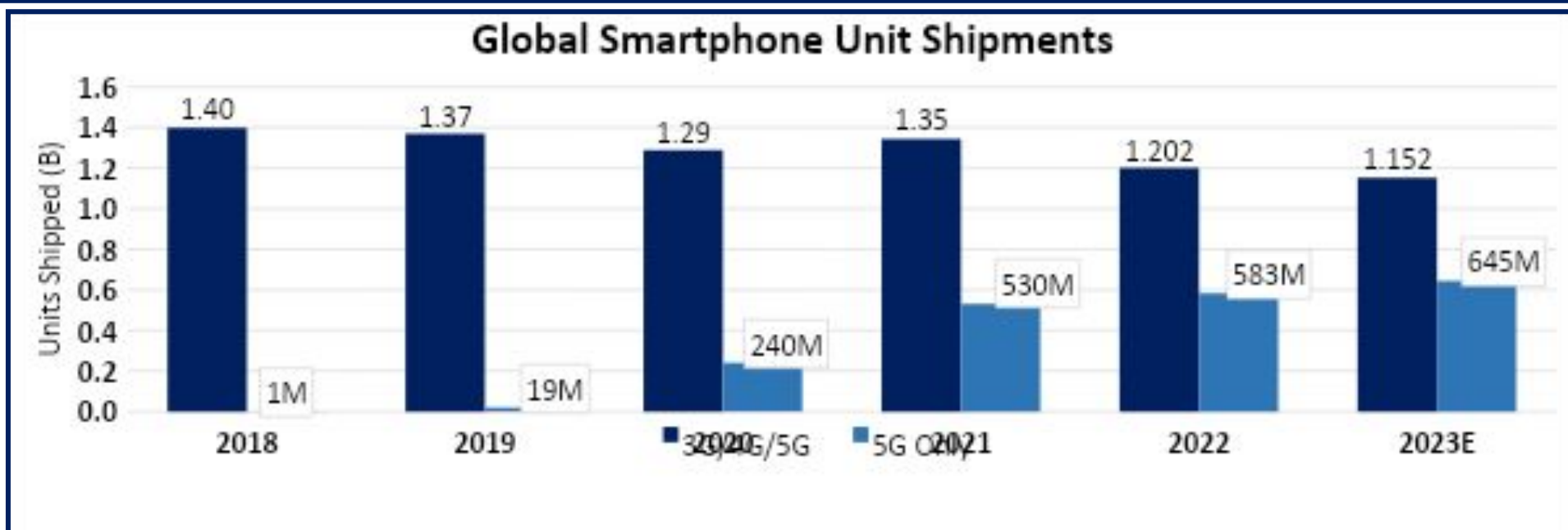
Chat GPT & other LLMs creating excitement, the realize AI Investments were already in place



Source: Gartner, IDC, Precedence Research, Intel, Nvidia, Seagate Edgewater Research

2023 Smartphone Outlook

2023 smartphones likely down again Y/Y, we see further risks to our estimates

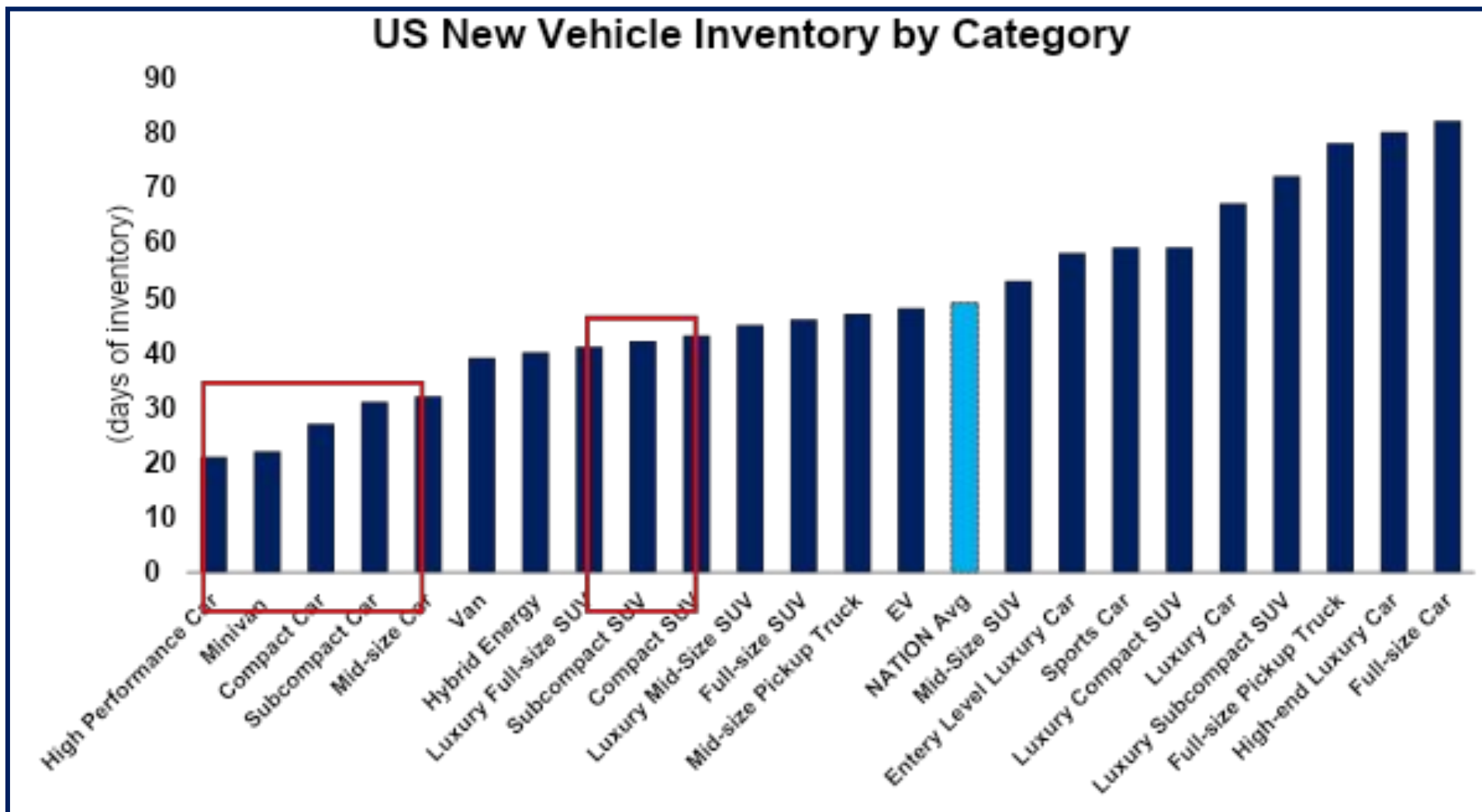


Smartphone Shipments 2021-2023									
Units (M)	Samsung	Apple	Xiaomi	Vivo	Oppo/One plus	Honor	Motorola	Others	Total
CY21	270	238	191	130	201	43	52	221	1,345
Y/Y growth	6%	12%	31%	26%	73%	N/A	N/A	-5%	4%
CY22	258	230	155	103	158	55	46	197	1,202
Y/Y growth	-4%	-3%	-19%	-20%	-21%	29%	-12%	-11%	-10.65%
CY23	261	229	147	87	150	55	47	192	1,168
Y/Y growth	1.16%	-0.43%	-5.16%	-15.53%	-5.06%	0.00%	2.17%	-2.54%	-2.83%

Source: IDC, Company Reports, Edgewater Research estimates

2023 Auto Outlook – Dealer Inventories

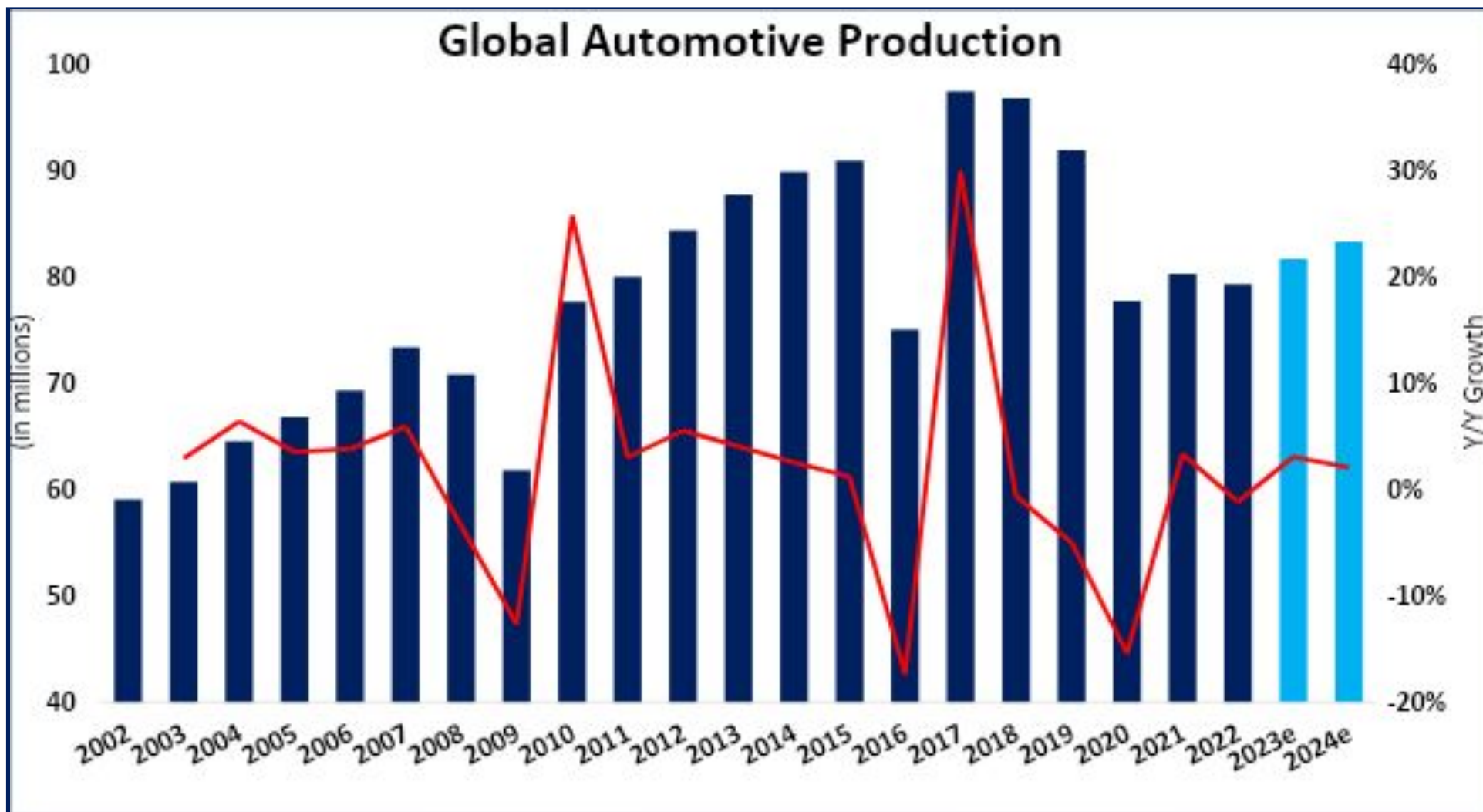
US dealer inventory levels doubled Y/Y, content rich vehicles > lower content vehicles



Source: Cox Automotive, Company Reports Edgewater Research estimates

2023 Auto Outlook

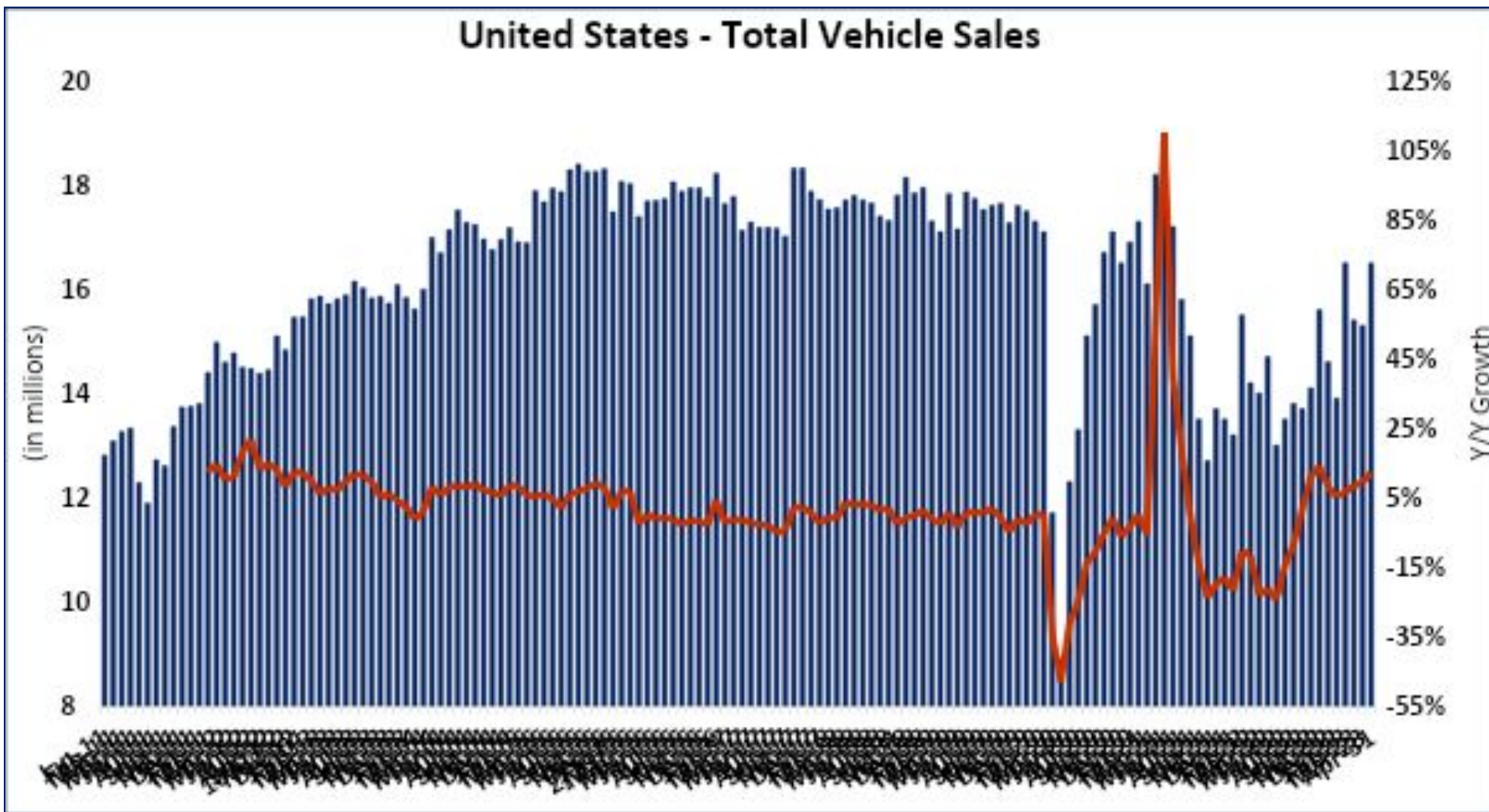
Dealer inventories growing, EV moderating, mix appears biased to mid/low-end units



Source: Factset, Company Reports Edgewater Research estimates

2023 Auto Outlook

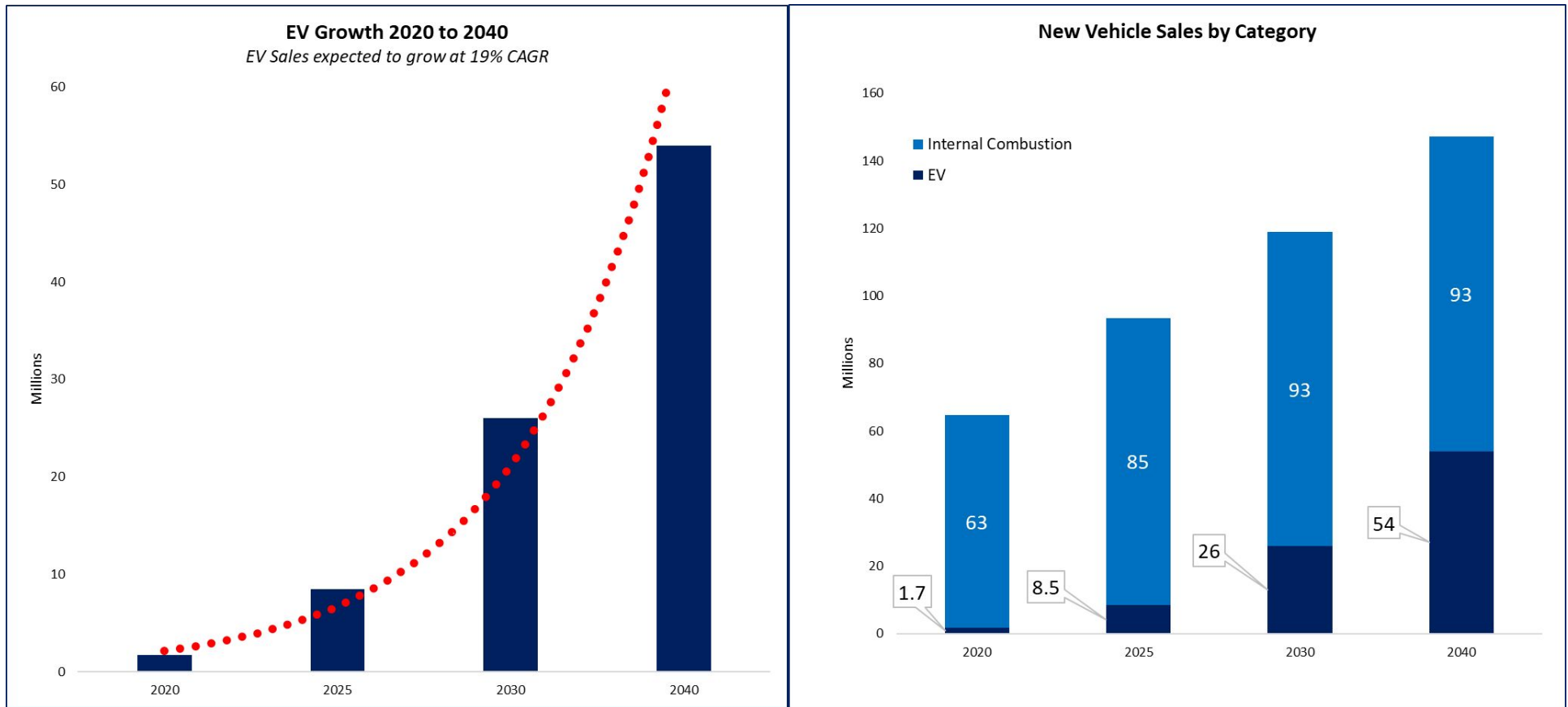
2023 SAAR supported by fleet sales; dealer inventory & interest rates remain a headwind



Source: Factset, Company Reports Edgewater Research estimates

Electric Vehicle

EV Sales Forecasted to Grow at a 19% CAGR through 2040

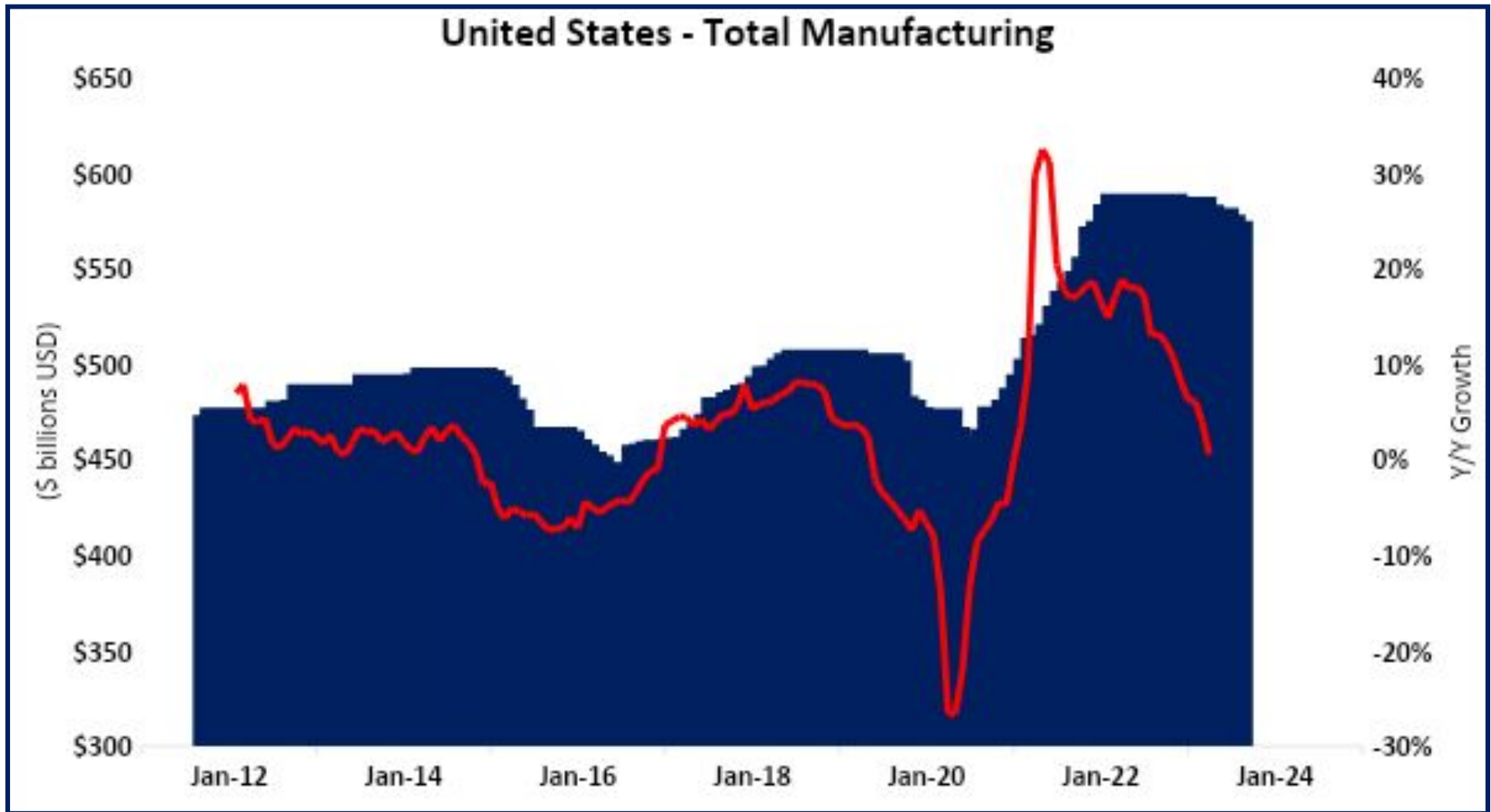


Electronic component revenues from EV may grow from ~\$7.5B in 2020 to \$12.5B+ in 2025.
Base case forecasts for 2030 are \$81B and content additions could push to >\$240B

Source: Bloomberg, Edgewater Research

2023 Industrial Demand Outlook

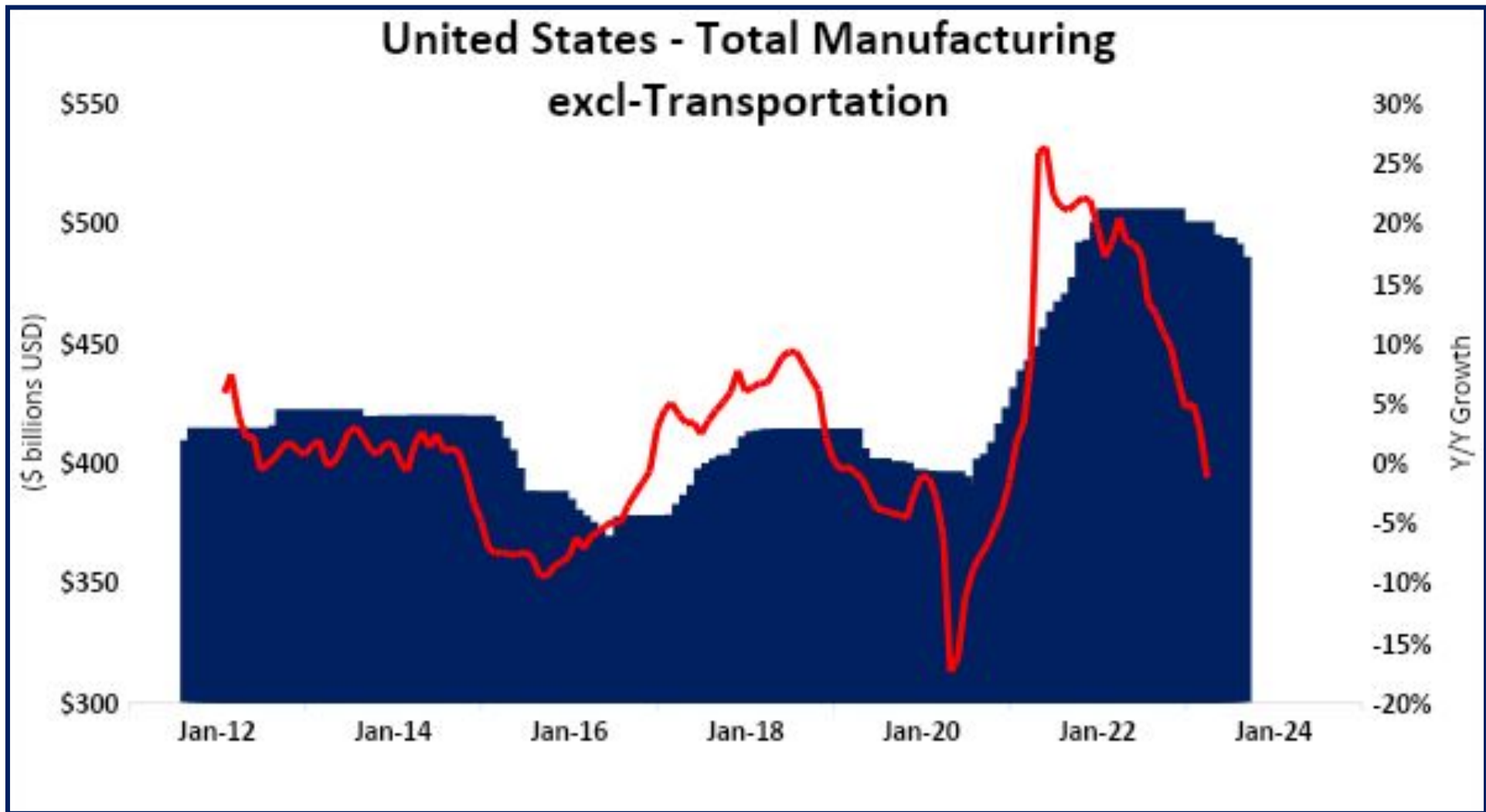
United States' manufacturing continues to moderate, expecting LSD growth in 2023



Source: Factset, Company Reports Edgewater Research estimates

2023 Industrial Demand Outlook

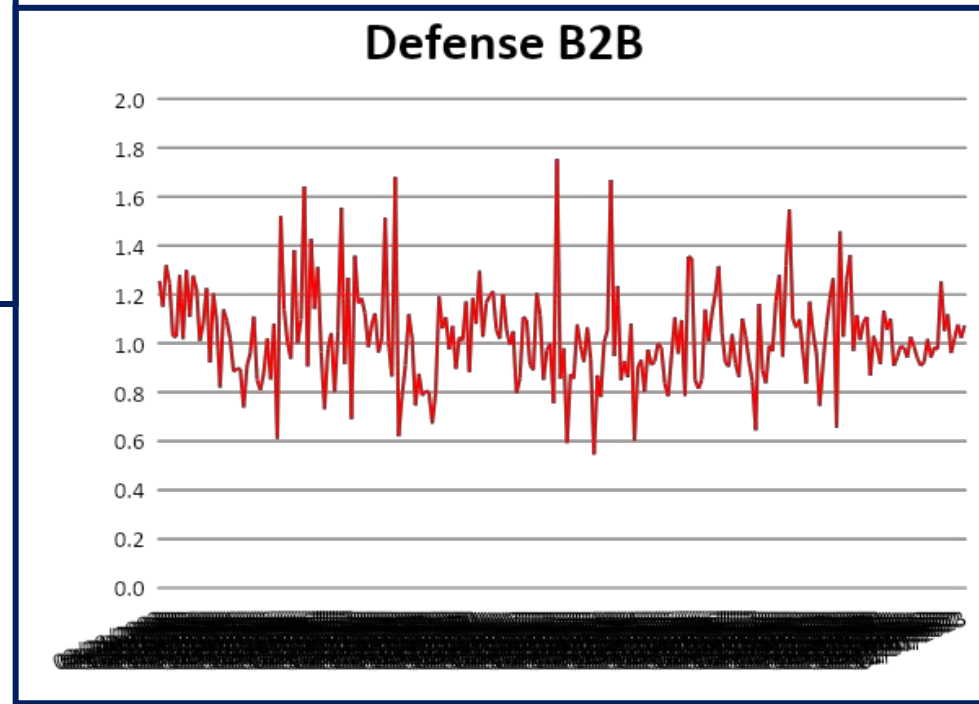
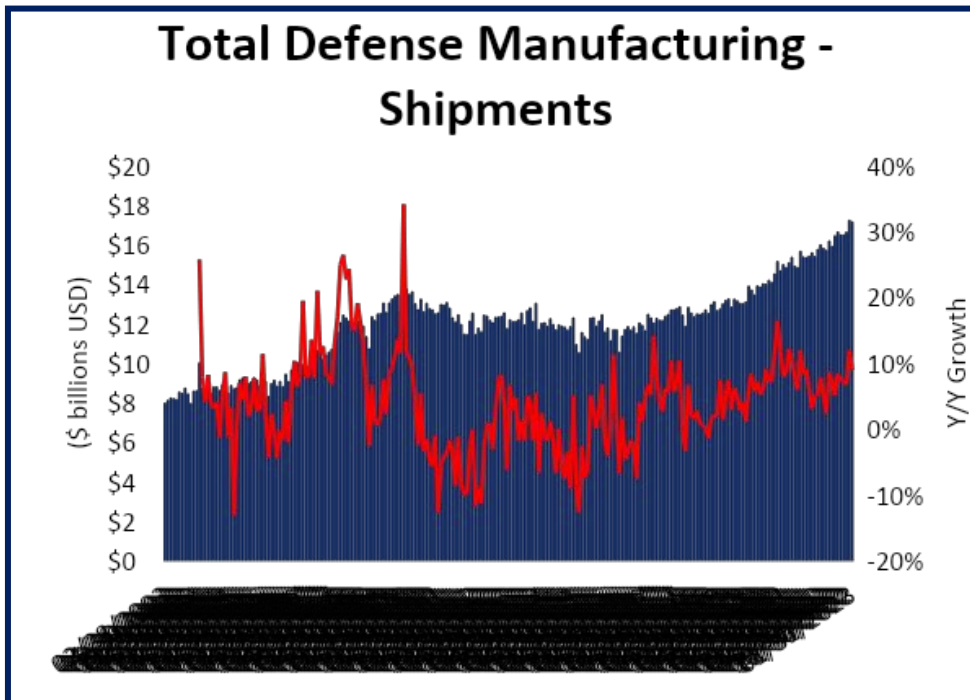
Excluding transportation, manufacturing has turned negative Y/Y in March



Source: Factset, Company Reports Edgewater Research estimates

2023 Military Demand Outlook

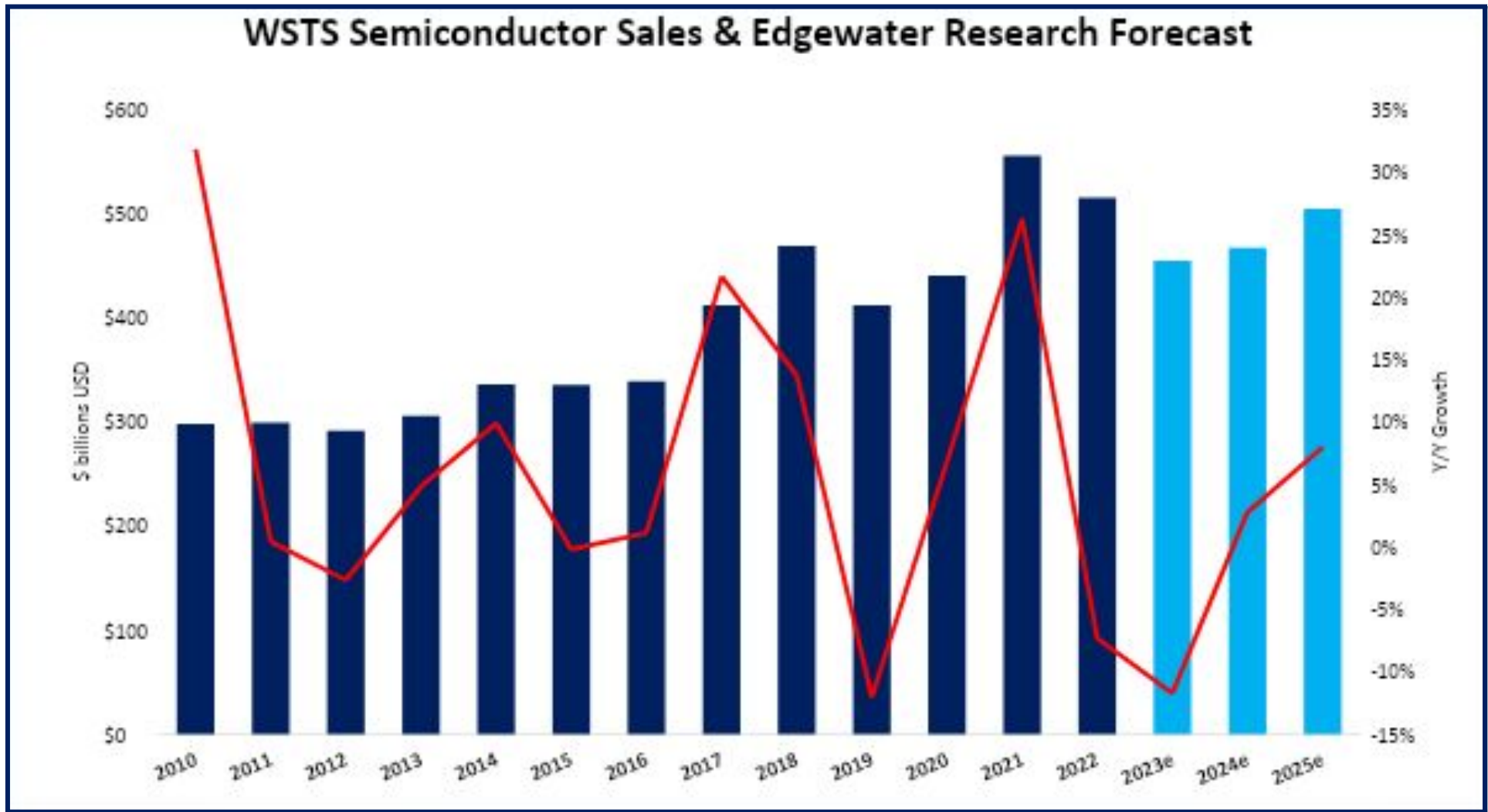
Total military spending at record levels, B2B 1.1x above 20-year average of 1x



Source: Factset, Company Reports Edgewater Research estimates

Edgewater Research Industry Sales Estimates

2023 semi revs now seen down 12% Y/Y on weaker memory, ex-memory down 5%



Source: WSTS, Edgewater Research estimates

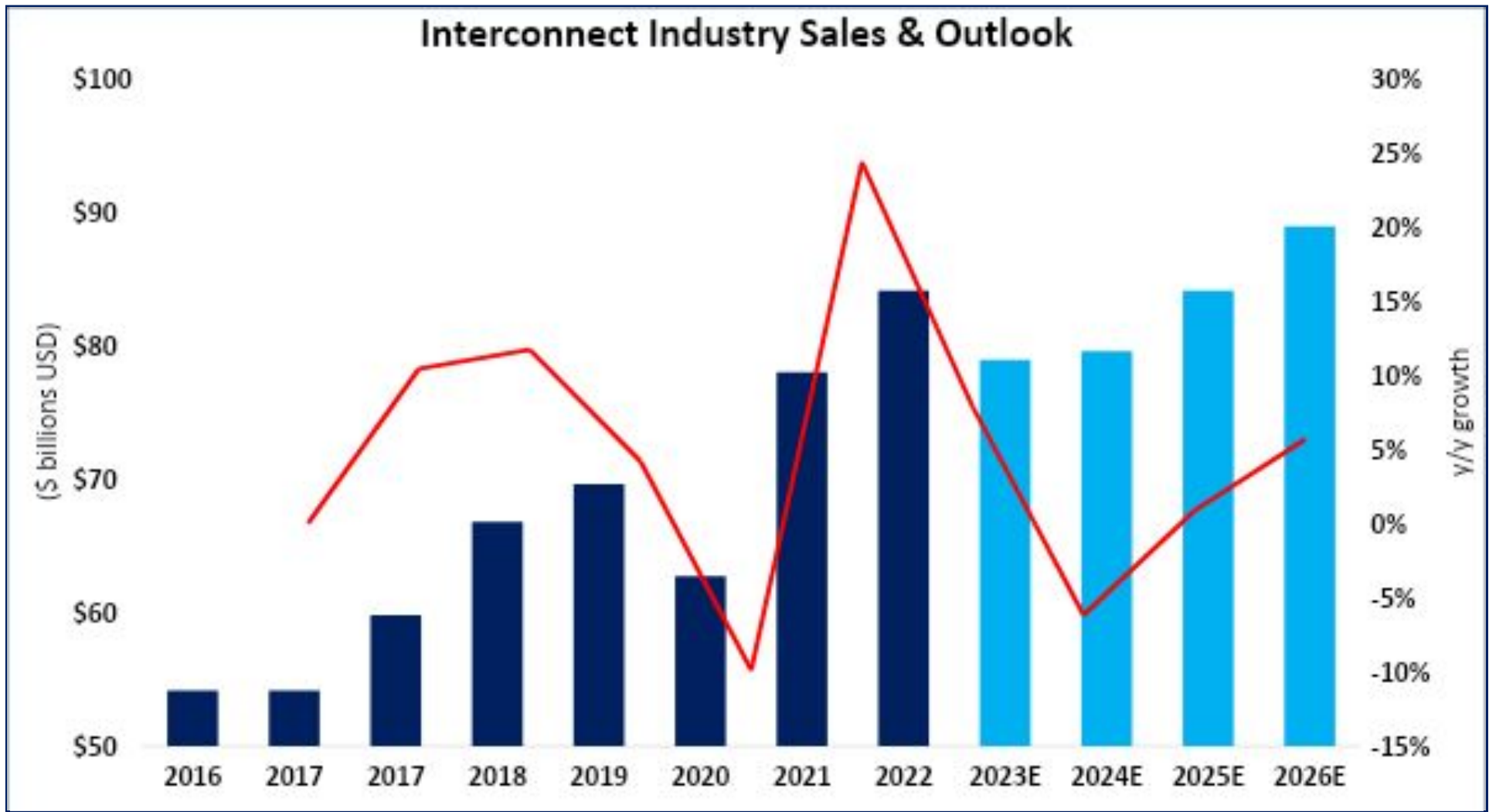


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Edgewater Research Industry Sales Estimates

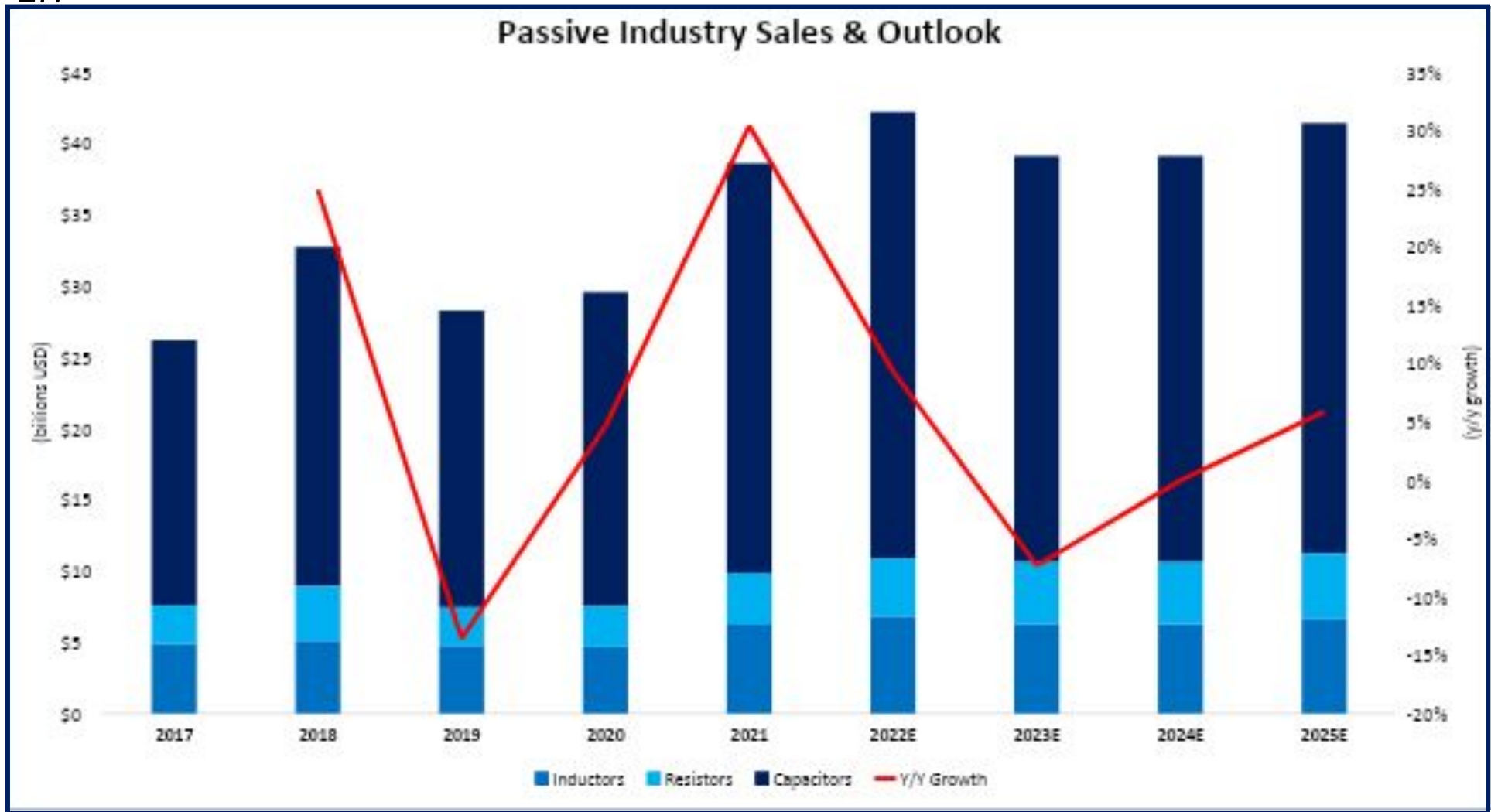
Weaker than expected China/APAC driving Interconnect sales lower Y/Y



Source: Bishop Report, Edgewater Research estimates

Edgewater Research Industry Sales Estimates

PC/Smartphone/Cons weakness driving passive sales -8% in 2023, price still a risk for 2H



Source: WSTS, Edgewater Research estimates

What is on the Horizon?

- Watch out for the ERA/Edgewater Industry Benchmarking Survey Starting in July!
- Be on the Lookout for Edgewater's New Distribution Report!
- Please Reach out to Ask About Upcoming Data Offerings from Edgewater!
- Please Reach Out!

Questions?

What Questions do you have?

APPENDIX

I, Dennis Reed, hereby certify that the views expressed in this research report accurately reflect our personal views about any or all of the subject securities referred to in this research report. We certify that no part of our compensation was, is or will be directly or indirectly related to the specific recommendations or views expressed in this research report. The analyst(s) responsible for the preparation of this report have no ownership stake in this company. Edgewater Research Company provides no investment banking services on this or any company.

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