2023

CHIN POON

Investor Conference

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Taoyuan City 33852, Taiwan (R.O.C.)
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Website: www.chinpoon.com

Disclaimer

The presentation contains projections & estimates of financial information as well as market and product developments for future periods. These projections & estimates are based on information currently available which we believe to be reliable, but they involve risks & uncertainties. Our actual results of operations & financial condition may differ significantly from those contained in projections & estimates. The projections & estimates should not be interpreted as legally binding commitments, but rather as flexible information subject to change occasionally.

Main Topics

- Introduction
- Investors' Focus
- Performance in 2023
- Global Auto Market
- Global EV Outlook
- Q&A

Introduction

- Company Profile
- Global Network
- Financial Position and ROE
- Specialty on Auto PCB

Company Profile

Company Name： Chin-Poon Industrial Co., Ltd.

Established： September 26th,1979 (Listed since October 1996)

Representative： Tseng-Liu, Yu-Chih / Chairperson

Business： Rigid Printed Circuit Board

Products： HDI, Multilayer (~26L) , Single-Sided, Double-Sided, Heavy Copper(~14oz), High Frequency, Metal Base & Pedestal, Flexible-PCB, Cu Inlay & Busbar STH（Silver Paste Through Hole）, Cu TH（Copper Paste Through Hole）

Capital： NT$ 3.97 billions

Equity： NT$ 16.11 billions (2023Q3)

Revenue： NT$ 17.61 billions (2022) and NT$ 12.41 billions (2023Q3)

Employee： 7,100+ (Taiwan 3,000+ , China 3,000+ , Thailand 1,100+)

Address： No.17, Ln. 5, Sec. 2, Nanshan Rd., Luzhu Dist., Taoyuan City 33852, Taiwan

Total Solutions for PCB

SS/NPTH/STH/CPTH

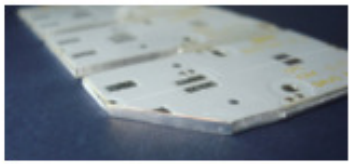
Appliances、TV Remote Controller、Car Dashboard...

High Frequency

ADAS Radar、Satellite Antenna、Smart Antenna、LNB...

Multilayer (~26L)

Car ECU、Server、Telecom、Automation、Medical...

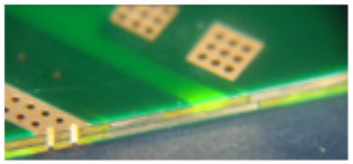


Metal Base & Pedestal

LED TV BLM、Traffic Lighting、Commercial Lighting、Projector Light Source、Car Lighting、Elec. Braking...

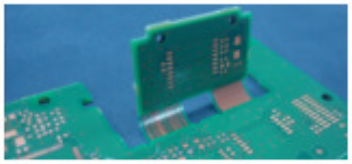
HDI & IVH

Car Infortainment、ECU、ADAS、Camera、Router...



Heavy Copper (~14oz)

Car OBC、Junction Box、High Power Inverter、Converter



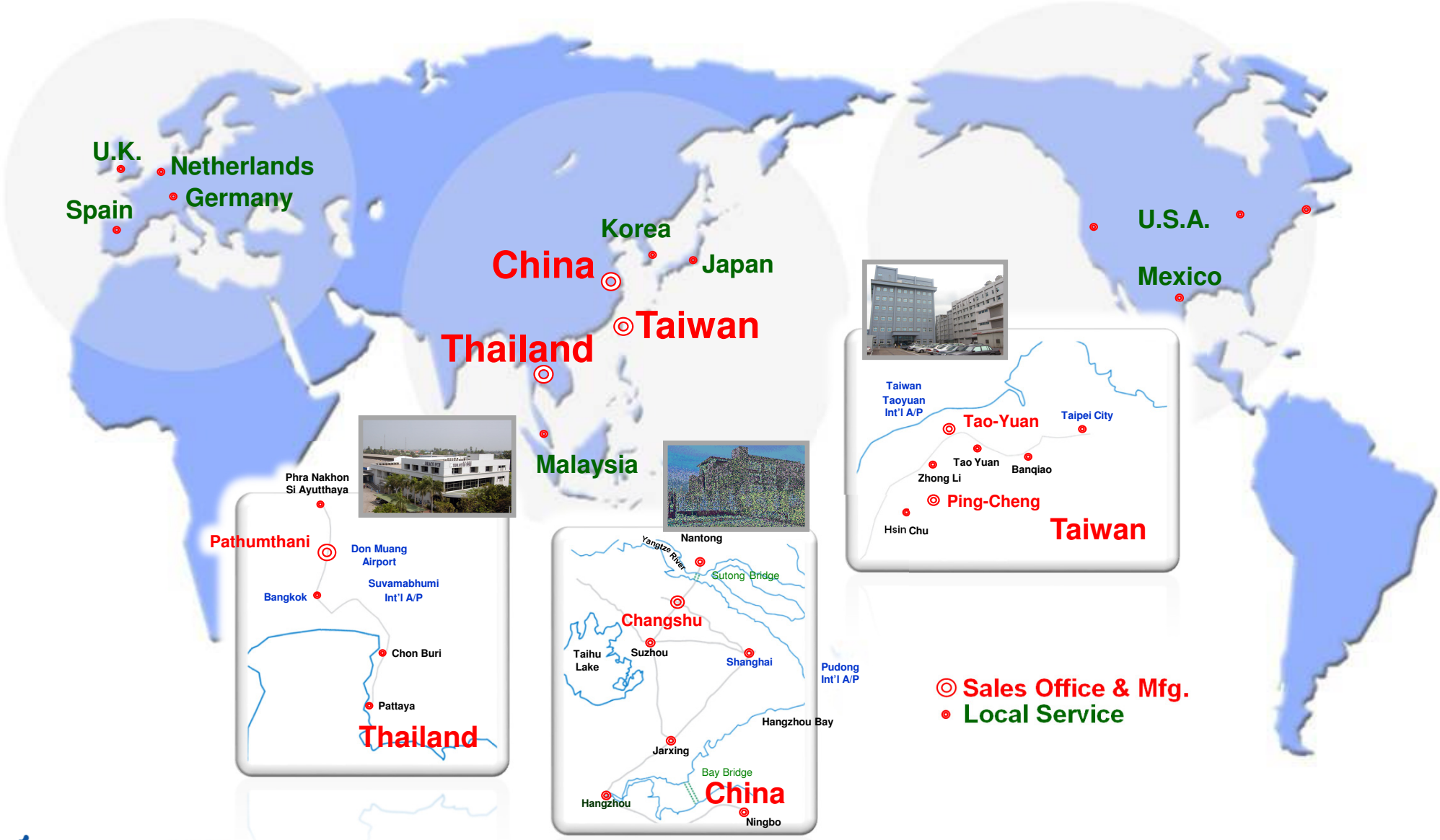
Flexible PCB

Car ECU、Junction Box、Car EPS、ADAS、Household Appliances...

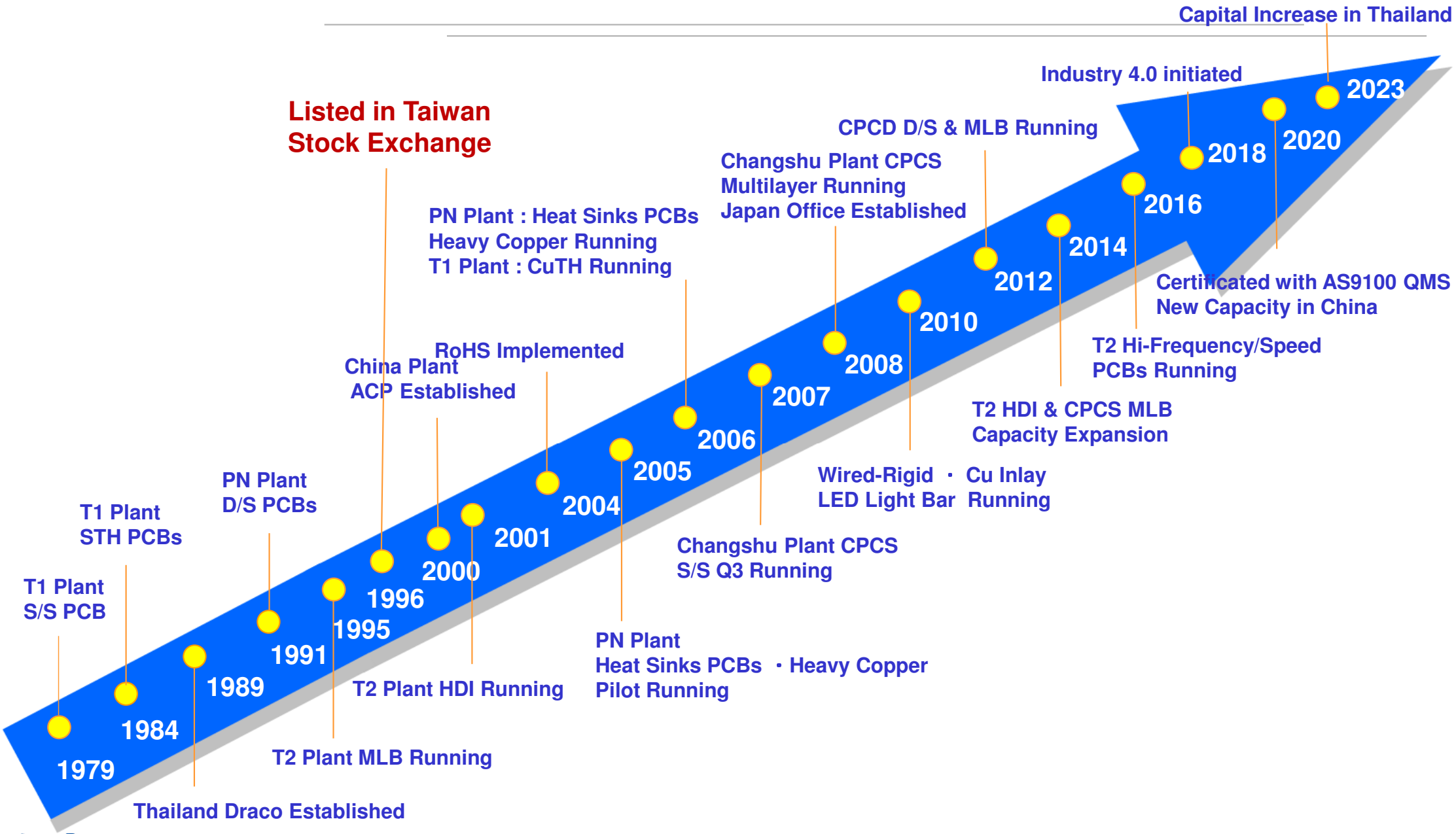
Cu Inlay & Busbar

Elec. Braking、LED Light Engine、Industrial Power Managing、Energy Storage、High-Power Module

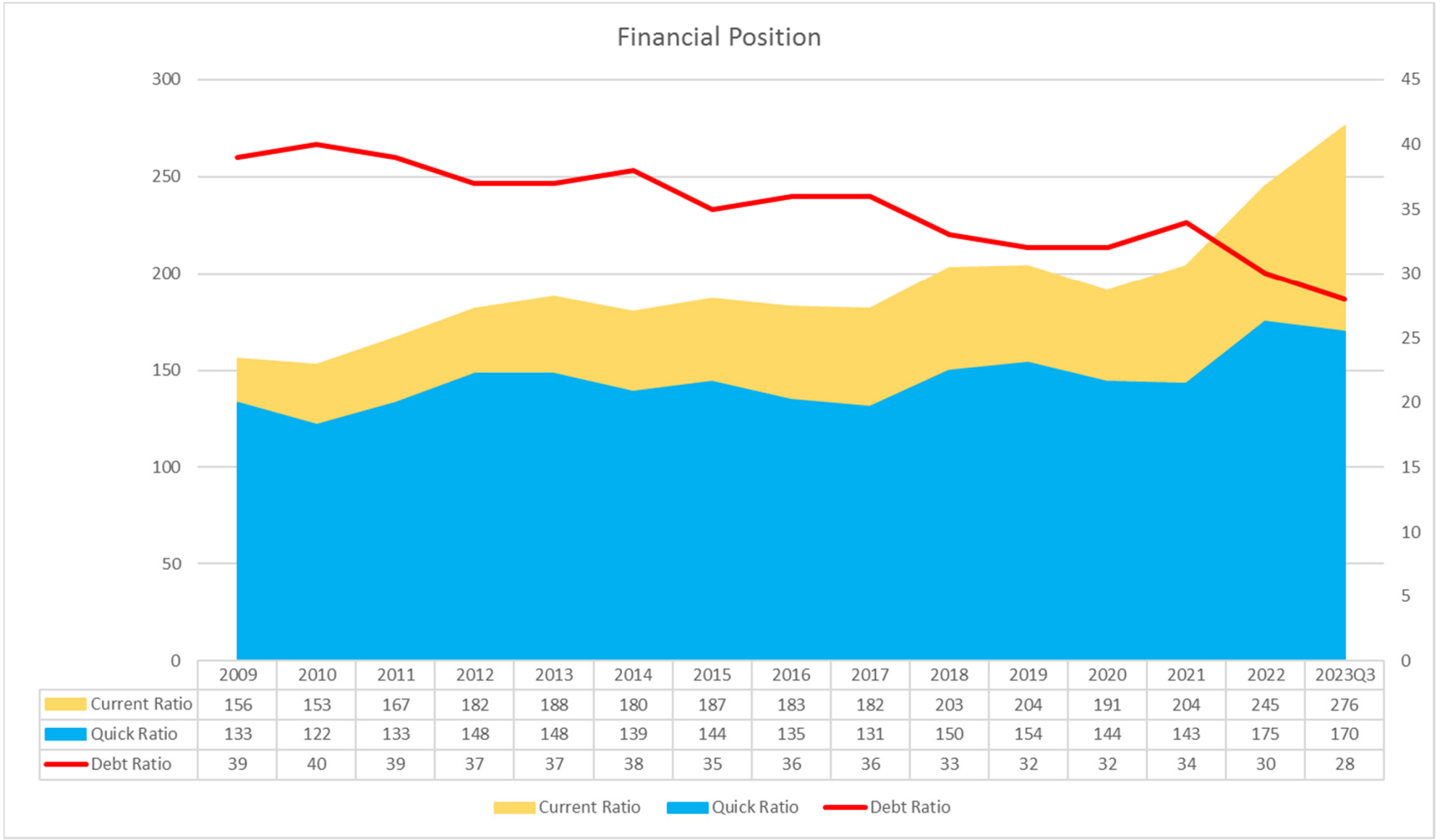
Global Network



Milestone

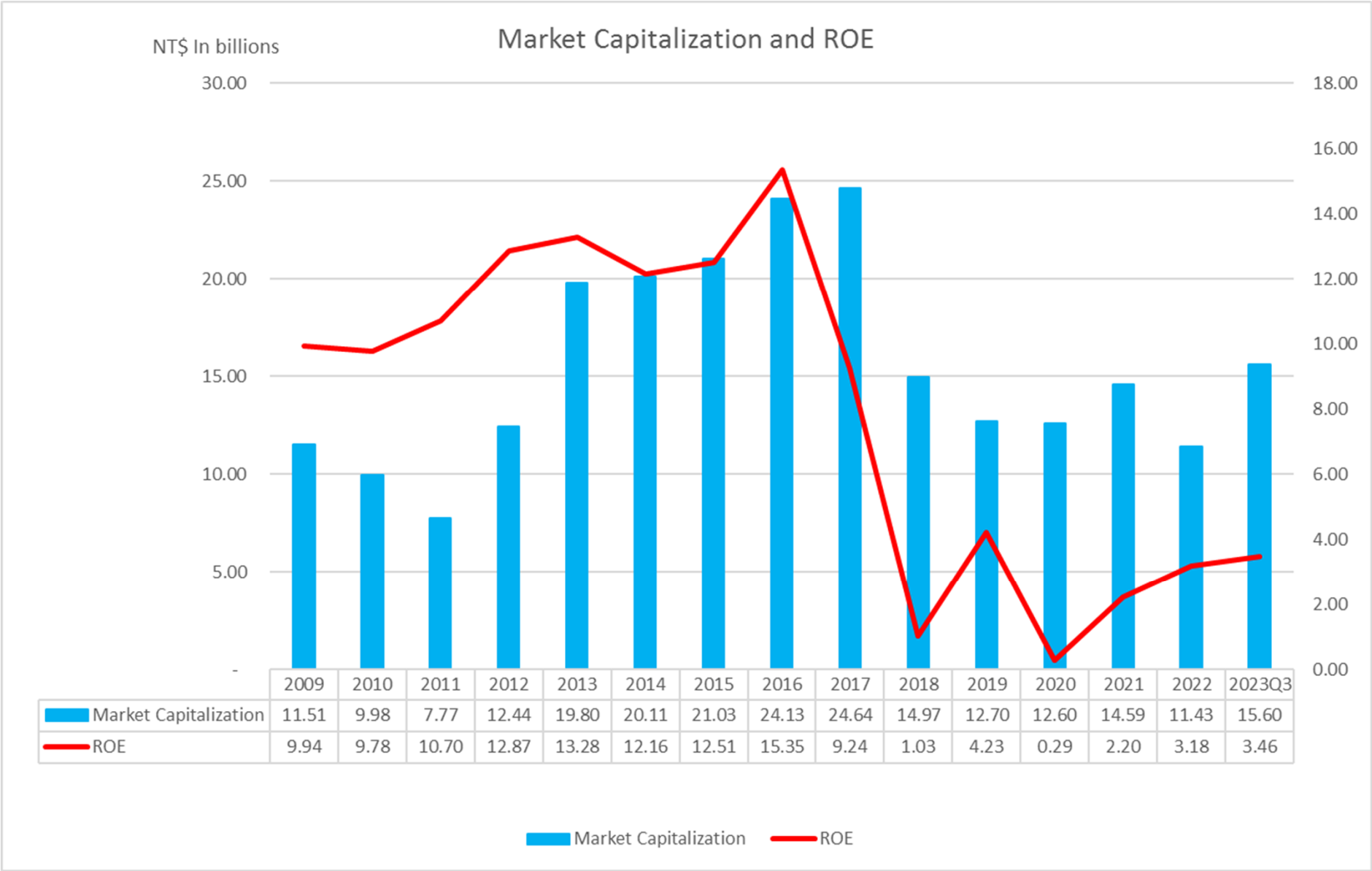

1979
T1 Plant S/S PCB
1984
T1 Plant STH PCBs
1989
Thailand Draco Established
1991
PN Plant D/S PCBs
1995
T2 Plant MLB Running
1996
Listed in Taiwan Stock Exchange
2000
China Plant ACP Established
2001
RoHS Implemented
2004
PN Plant : Heat Sinks PCBs Heavy Copper Running T1 Plant : CuTH Running
2005
PN Plant Heat Sinks PCBs ・Heavy Copper Pilot Running
2006
Changshu Plant CPCS S/S Q3 Running
2007
Changshu Plant CPCS Multilayer Running Japan Office Established
2008
Wired-Rigid ・ Cu Inlay LED Light Bar Running
2010
CPCD D/S & MLB Running
2012
T2 HDI & CPCS MLB Capacity Expansion
2014
T2 Hi-Frequency/Speed PCBs Running
2016
Certificated with AS9100 QMS New Capacity in China
2018
Industry 4.0 initiated
2020
2023
Capital Increase in Thailand

Strong Financial Position



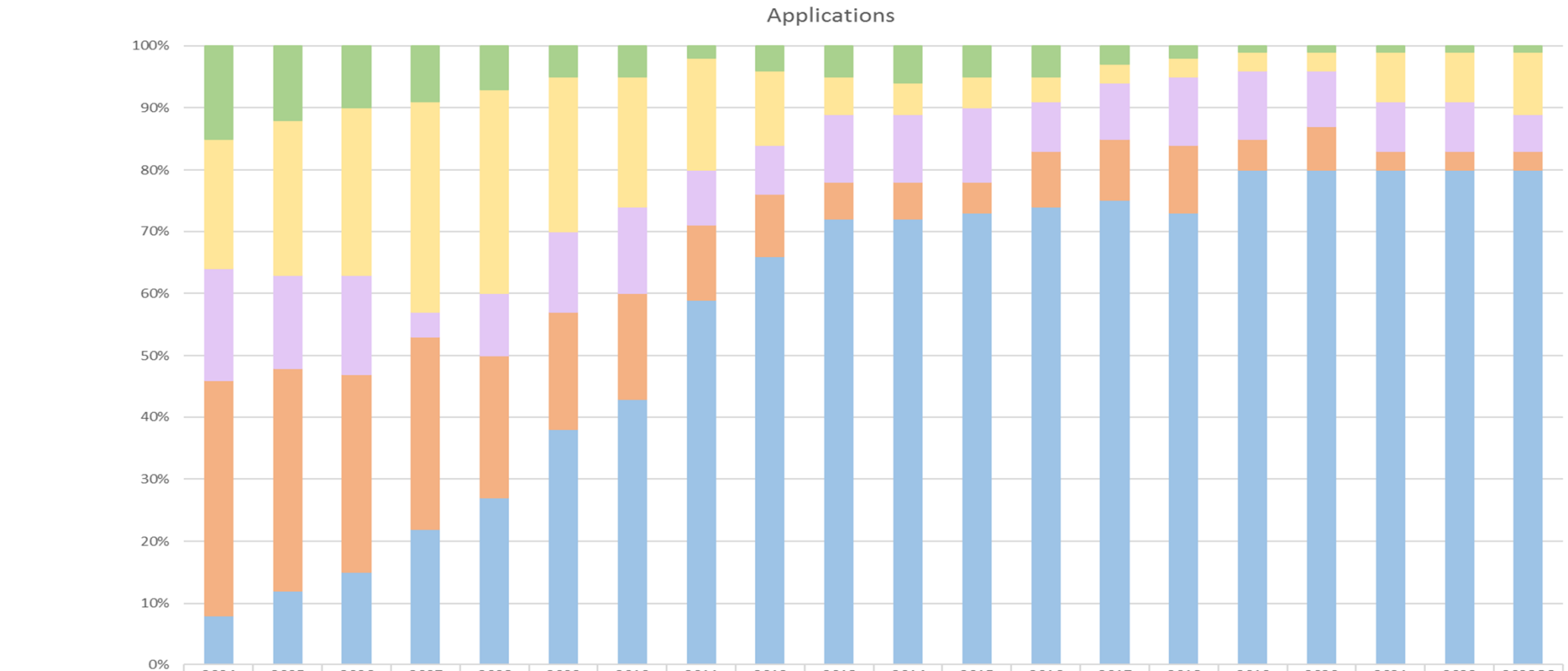
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023Q3
Current Ratio	156	153	167	182	188	180	187	183	182	203	204	191	204	245	276
Quick Ratio	133	122	133	148	148	139	144	135	131	150	154	144	143	175	170
Debt Ratio	39	40	39	37	37	38	35	36	36	33	32	32	34	30	28

Market Capitalization and ROE



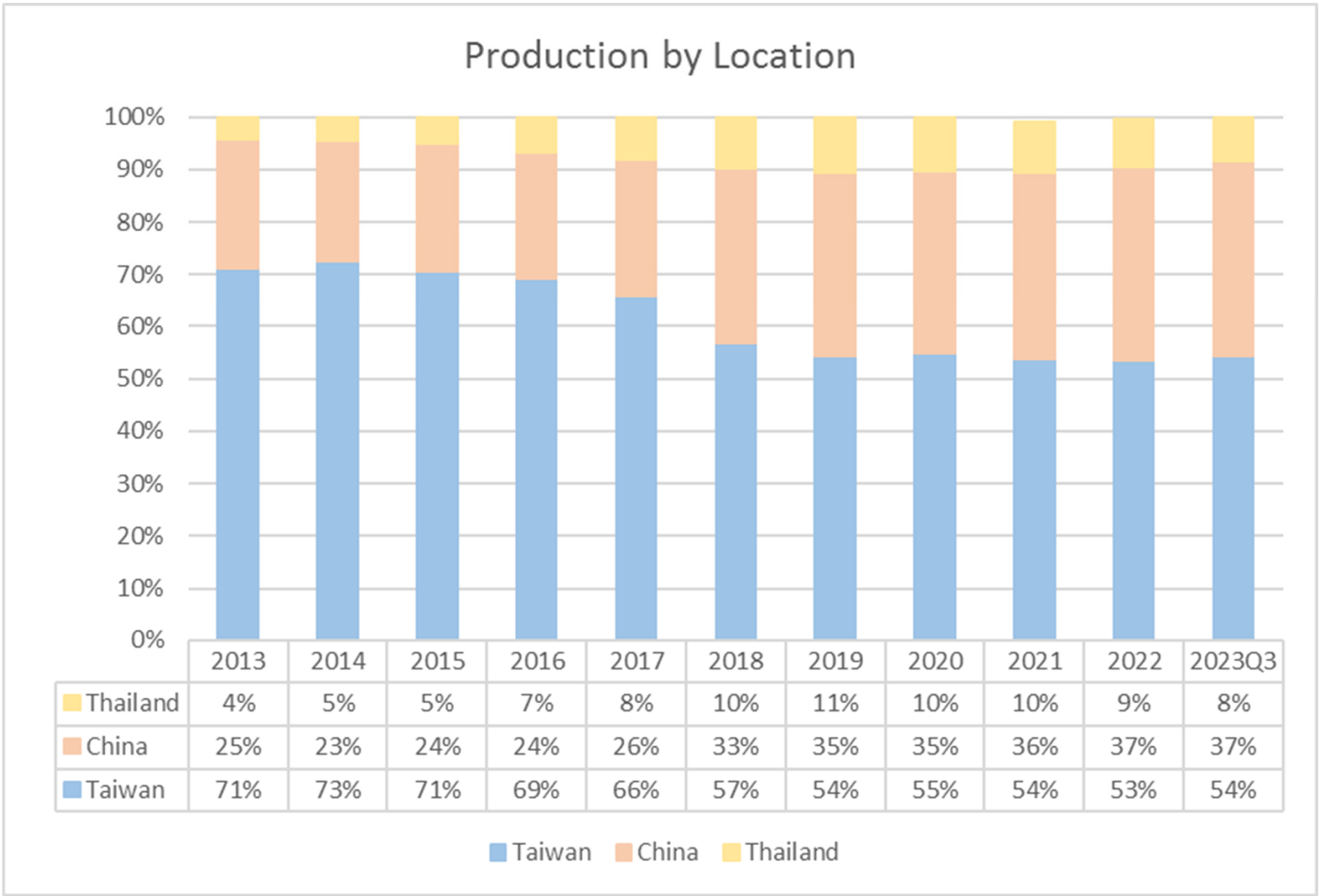
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023Q3
Market Capitalization	11.51	9.98	7.77	12.44	19.80	20.11	21.03	24.13	24.64	14.97	12.70	12.60	14.59	11.43	15.60
ROE	9.94	9.78	10.70	12.87	13.28	12.16	12.51	15.35	9.24	1.03	4.23	0.29	2.20	3.18	3.46

Specialty on Auto PCB



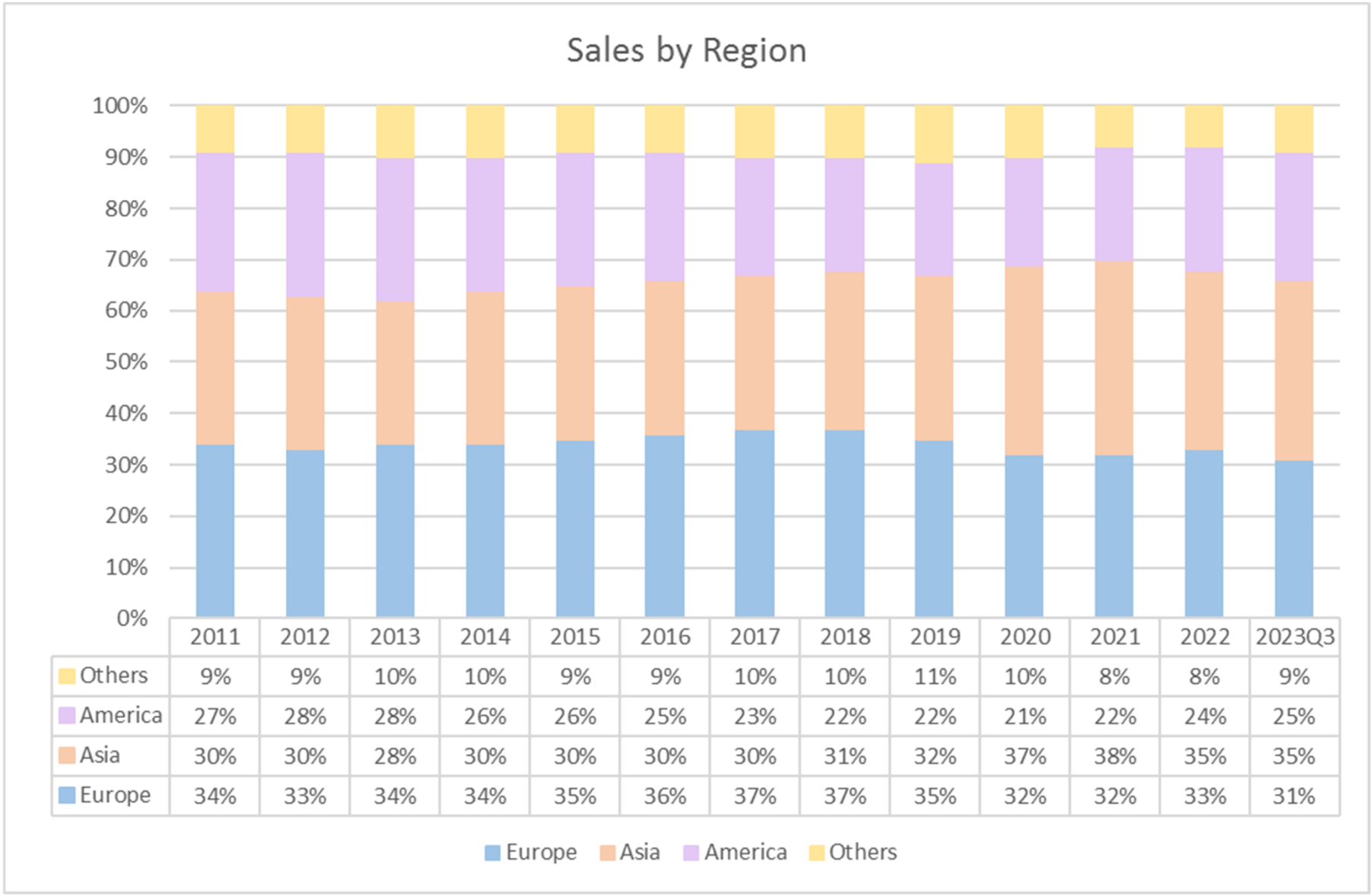
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023Q3
Others	15%	12%	10%	9%	7%	5%	5%	2%	4%	5%	6%	5%	5%	3%	2%	1%	1%	1%	1%	1%
Telecommunication	21%	25%	27%	34%	33%	25%	21%	18%	12%	6%	5%	5%	4%	3%	3%	3%	3%	8%	8%	10%
Industrial Electronics	18%	15%	16%	4%	10%	13%	14%	9%	8%	11%	11%	12%	8%	9%	11%	11%	9%	8%	8%	6%
Consumers' Electronic	38%	36%	32%	31%	23%	19%	17%	12%	10%	6%	6%	5%	9%	10%	11%	5%	7%	3%	3%	3%
Automobile Electronics	8%	12%	15%	22%	27%	38%	43%	59%	66%	72%	72%	73%	74%	75%	73%	80%	80%	80%	80%	80%

54% of Production in Taiwan



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023Q3
Thailand	4%	5%	5%	7%	8%	10%	11%	10%	10%	9%	8%
China	25%	23%	24%	24%	26%	33%	35%	35%	36%	37%	37%
Taiwan	71%	73%	71%	69%	66%	57%	54%	55%	54%	53%	54%

Chin Poon's Sales by Region

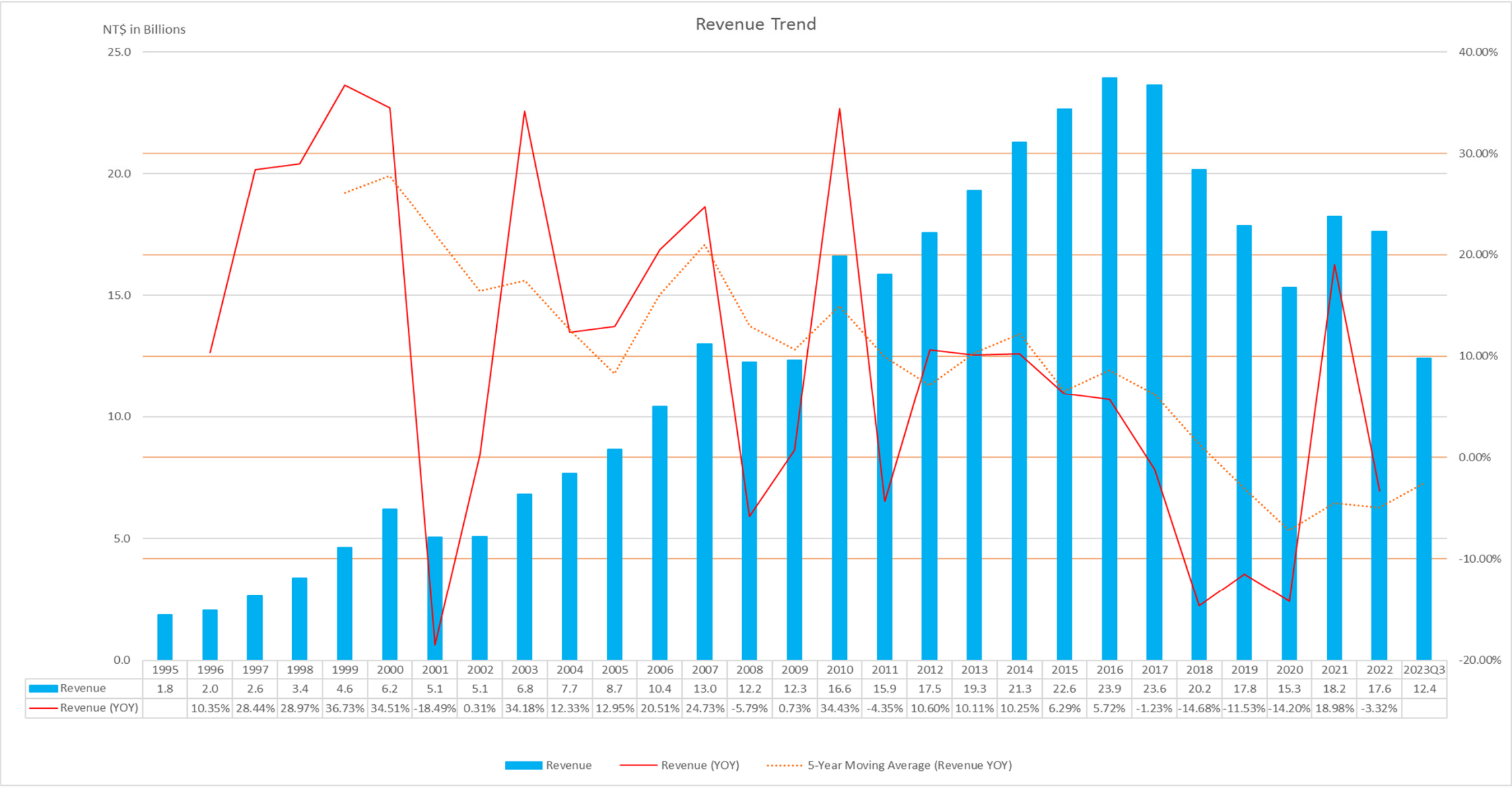


	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023Q3
Others	9%	9%	10%	10%	9%	9%	10%	10%	11%	10%	8%	8%	9%
America	27%	28%	28%	26%	26%	25%	23%	22%	22%	21%	22%	24%	25%
Asia	30%	30%	28%	30%	30%	30%	30%	31%	32%	37%	38%	35%	35%
Europe	34%	33%	34%	34%	35%	36%	37%	37%	35%	32%	32%	33%	31%

Investors' Focus

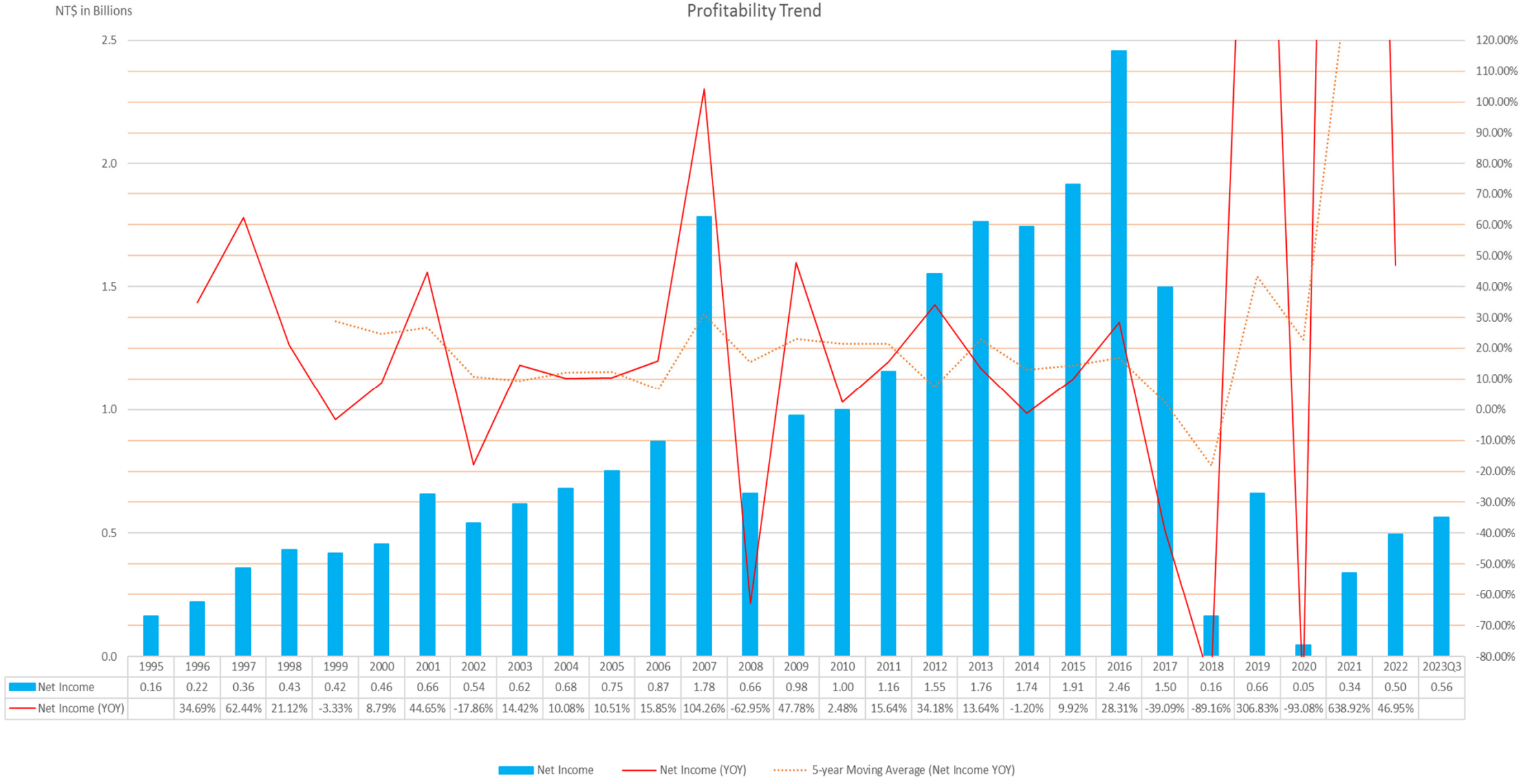
- Revenue Trend
- Profitability Trend
- New Business
- Payout Ratio
- Capex

Revenue Trend



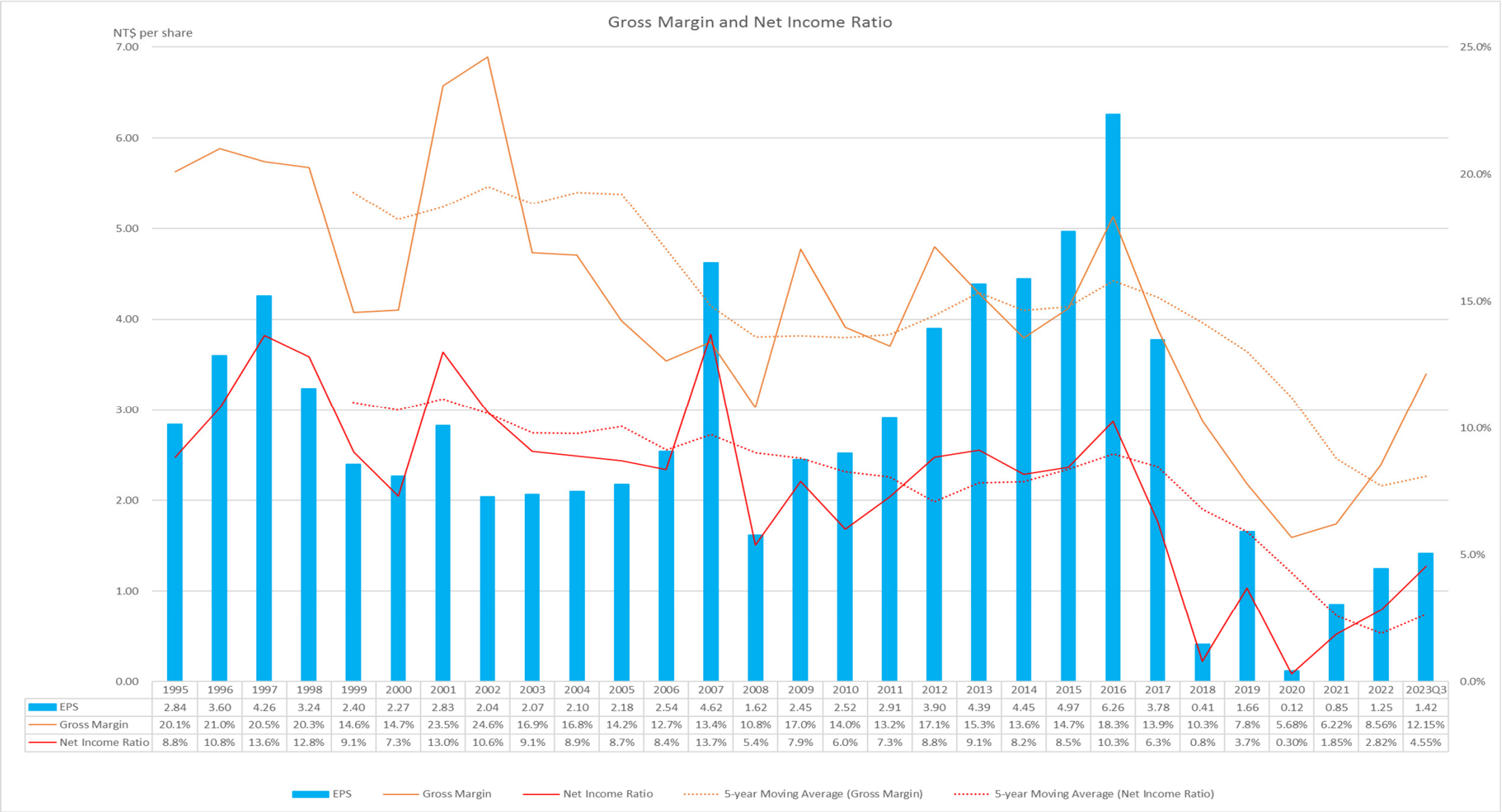
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023Q3
Revenue	1.8	2.0	2.6	3.4	4.6	6.2	5.1	5.1	6.8	7.7	8.7	10.4	13.0	12.2	12.3	16.6	15.9	17.5	19.3	21.3	22.6	23.9	23.6	20.2	17.8	15.3	18.2	17.6	12.4
Revenue (YOY)		10.35%	28.44%	28.97%	36.73%	34.51%	-18.49%	0.31%	34.18%	12.33%	12.95%	20.51%	24.73%	-5.79%	0.73%	34.43%	-4.35%	10.60%	10.11%	10.25%	6.29%	5.72%	-1.23%	-14.68%	-11.53%	-14.20%	18.98%	-3.32%	

Profitability Trend



	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023Q3
Net Income	0.16	0.22	0.36	0.43	0.42	0.46	0.66	0.54	0.62	0.68	0.75	0.87	1.78	0.66	0.98	1.00	1.16	1.55	1.76	1.74	1.91	2.46	1.50	0.16	0.66	0.05	0.34	0.50	0.56
Net Income (YOY)		34.69%	62.44%	21.12%	-3.33%	8.79%	44.65%	-17.86%	14.42%	10.08%	10.51%	15.85%	104.26%	-62.95%	47.78%	2.48%	15.64%	34.18%	13.64%	-1.20%	9.92%	28.31%	-39.09%	-89.16%	306.83%	-93.08%	638.92%	46.95%	

Gross Margin and Net Income Ratio



	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023Q3
EPS	2.84	3.60	4.26	3.24	2.40	2.27	2.83	2.04	2.07	2.10	2.18	2.54	4.62	1.62	2.45	2.52	2.91	3.90	4.39	4.45	4.97	6.26	3.78	0.41	1.66	0.12	0.85	1.25	1.42
Gross Margin	20.1%	21.0%	20.5%	20.3%	14.6%	14.7%	23.5%	24.6%	16.9%	16.8%	14.2%	12.7%	13.4%	10.8%	17.0%	14.0%	13.2%	17.1%	15.3%	13.6%	14.7%	18.3%	13.9%	10.3%	7.8%	5.68%	6.22%	8.56%	12.15%
Net Income Ratio	8.8%	10.8%	13.6%	12.8%	9.1%	7.3%	13.0%	10.6%	9.1%	8.9%	8.7%	8.4%	13.7%	5.4%	7.9%	6.0%	7.3%	8.8%	9.1%	8.2%	8.5%	10.3%	6.3%	0.8%	3.7%	0.30%	1.85%	2.82%	4.55%

Our Status in Electric Vehicles Business

In response to the decline in global sales of internal combustion engine vehicles in the future, our company has been developing a number of new business.

Three main supply chains in the EV business: the conventional automotive supply chain, the technology-oriented EV supply chain in the United States, and the Chinese EV supply chain. We have developed a comprehensive EV business in all of the supply chains, and have achieved the targets set last year .

Our EV products have been shipped to the following automotive supply chain.

1. The conventional automotive supply chain:
   Our major focus is on the conventional automotive supply chain. Currently, our products have been used in the EVs of VW, Stellantis, Toyota, Ford and etc. We are even the main supplier of a certain European ultra-luxury electric sports car.
2. The technology-oriented EV supply chain in the United States :
   We have developed business relationship with them in the early stage. Our products have been used in the EVs of Lucid Motors, Rivian, Fisker, GM Cruise, tesla, etc.
3. The Chinese EV supply chain:
   Our products have been used in the EVs from its conventional automotive supply chain and its technology-oriented EV supply chain in China.

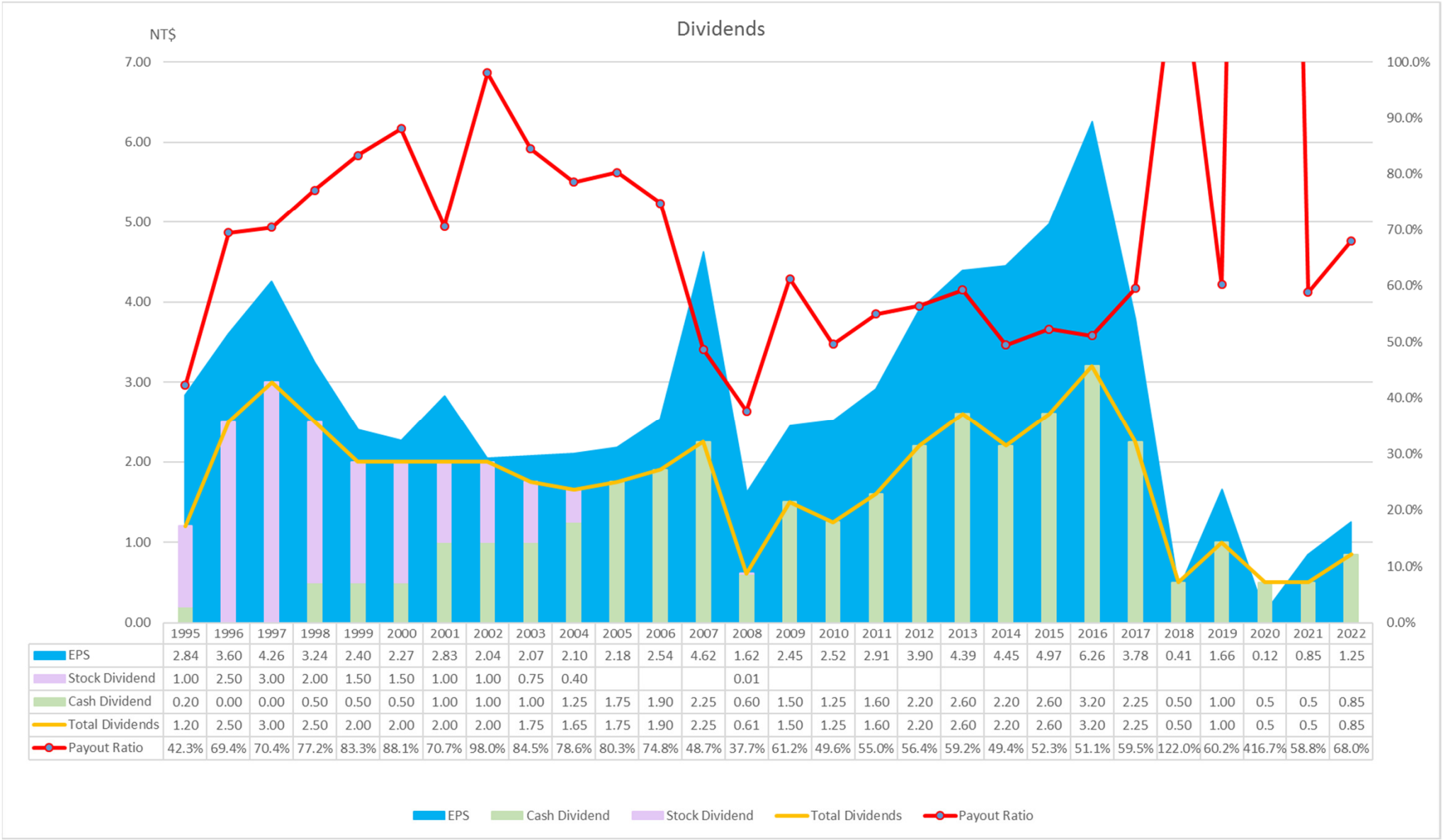
Our Status in Telecommunication Business

In response to the decline in global sales of internal combustion engine vehicles in the future, our company been developing a number of new business.

1. Low-Earth Orbit Satellites:
   We have obtained the certification of the "AS 9100 Aerospace Quality Management System" in 2020. We have being actively developing the businesses of Low-Earth Orbit Satellites since then and have acquired business from two low-orbit satellite manufacturers. In addition, we are actively developing other low-orbit satellite manufacturers.

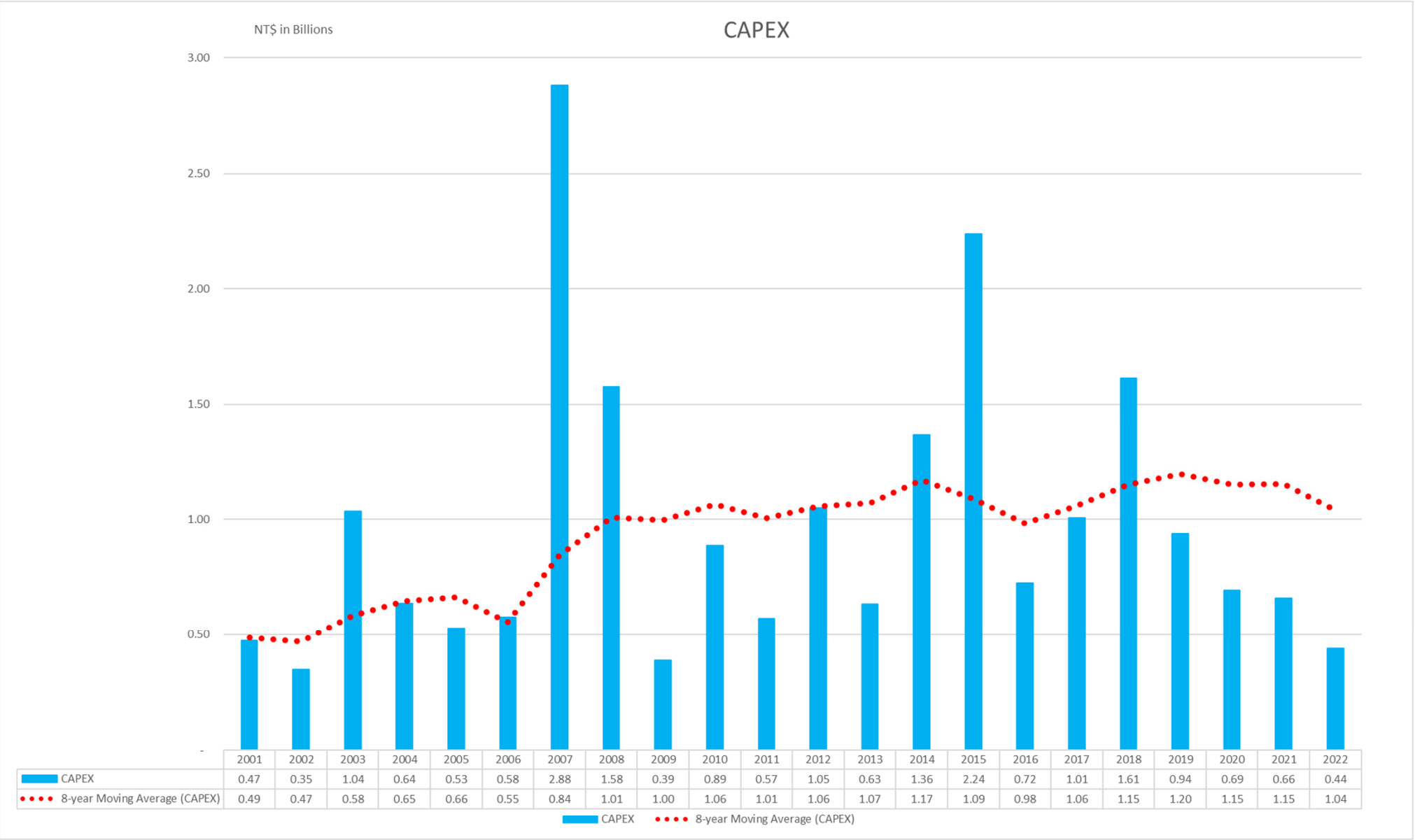
2. 5G communication:
   We have being developing business with two leading European telecom manufacturers

Payout Ratio



	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
EPS	2.84	3.60	4.26	3.24	2.40	2.27	2.83	2.04	2.07	2.10	2.18	2.54	4.62	1.62	2.45	2.52	2.91	3.90	4.39	4.45	4.97	6.26	3.78	0.41	1.66	0.12	0.85	1.25
Stock Dividend	1.00	2.50	3.00	2.00	1.50	1.50	1.00	1.00	0.75	0.40				0.01														
Cash Dividend	0.20	0.00	0.00	0.50	0.50	0.50	1.00	1.00	1.00	1.25	1.75	1.90	2.25	0.60	1.50	1.25	1.60	2.20	2.60	2.20	2.60	3.20	2.25	0.50	1.00	0.5	0.5	0.85
Total Dividends	1.20	2.50	3.00	2.50	2.00	2.00	2.00	2.00	1.75	1.65	1.75	1.90	2.25	0.61	1.50	1.25	1.60	2.20	2.60	2.20	2.60	3.20	2.25	0.50	1.00	0.5	0.5	0.85
Payout Ratio	42.3%	69.4%	70.4%	77.2%	83.3%	88.1%	70.7%	98.0%	84.5%	78.6%	80.3%	74.8%	48.7%	37.7%	61.2%	49.6%	55.0%	56.4%	59.2%	49.4%	52.3%	51.1%	59.5%	122.0%	60.2%	416.7%	58.8%	68.0%

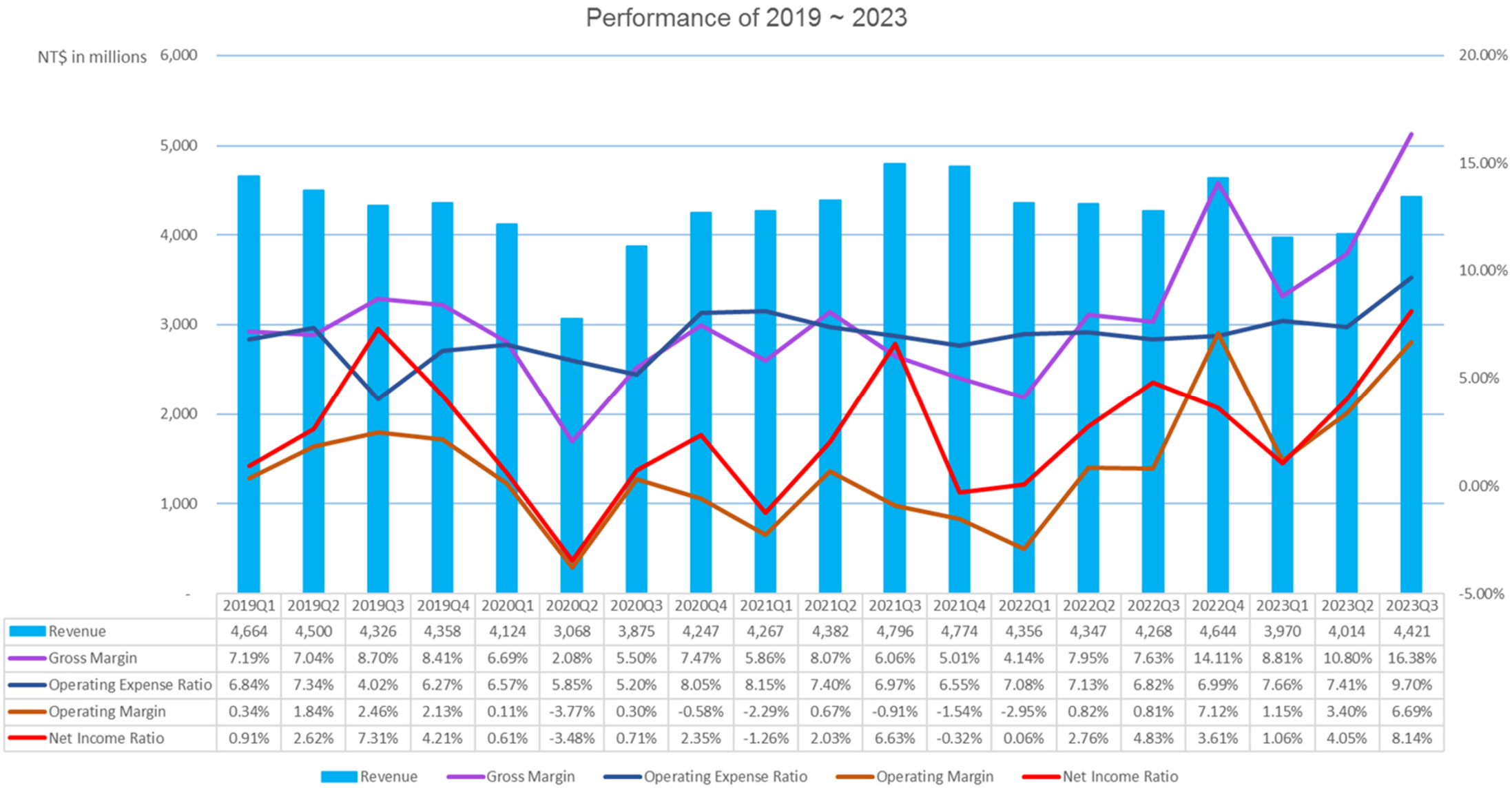
CAPEX



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
CAPEX	0.47	0.35	1.04	0.64	0.53	0.58	2.88	1.58	0.39	0.89	0.57	1.05	0.63	1.36	2.24	0.72	1.01	1.61	0.94	0.69	0.66	0.44
8-year Moving Average (CAPEX)	0.49	0.47	0.58	0.65	0.66	0.55	0.84	1.01	1.00	1.06	1.01	1.06	1.07	1.17	1.09	0.98	1.06	1.15	1.20	1.15	1.15	1.04

Performance in 2019 ~ 2023

Performance of 2019 ~ 2023



	2019Q1	2019Q2	2019Q3	2019Q4	2020Q1	2020Q2	2020Q3	2020Q4	2021Q1	2021Q2	2021Q3	2021Q4	2022Q1	2022Q2	2022Q3	2022Q4	2023Q1	2023Q2	2023Q3
Revenue	4,664	4,500	4,326	4,358	4,124	3,068	3,875	4,247	4,267	4,382	4,796	4,774	4,356	4,347	4,268	4,644	3,970	4,014	4,421
Gross Margin	7.19%	7.04%	8.70%	8.41%	6.69%	2.08%	5.50%	7.47%	5.86%	8.07%	6.06%	5.01%	4.14%	7.95%	7.63%	14.11%	8.81%	10.80%	16.38%
Operating Expense Ratio	6.84%	7.34%	4.02%	6.27%	6.57%	5.85%	5.20%	8.05%	8.15%	7.40%	6.97%	6.55%	7.08%	7.13%	6.82%	6.99%	7.66%	7.41%	9.70%
Operating Margin	0.34%	1.84%	2.46%	2.13%	0.11%	-3.77%	0.30%	-0.58%	-2.29%	0.67%	-0.91%	-1.54%	-2.95%	0.82%	0.81%	7.12%	1.15%	3.40%	6.69%
Net Income Ratio	0.91%	2.62%	7.31%	4.21%	0.61%	-3.48%	0.71%	2.35%	-1.26%	2.03%	6.63%	-0.32%	0.06%	2.76%	4.83%	3.61%	1.06%	4.05%	8.14%

FX Impact on Gross Margin

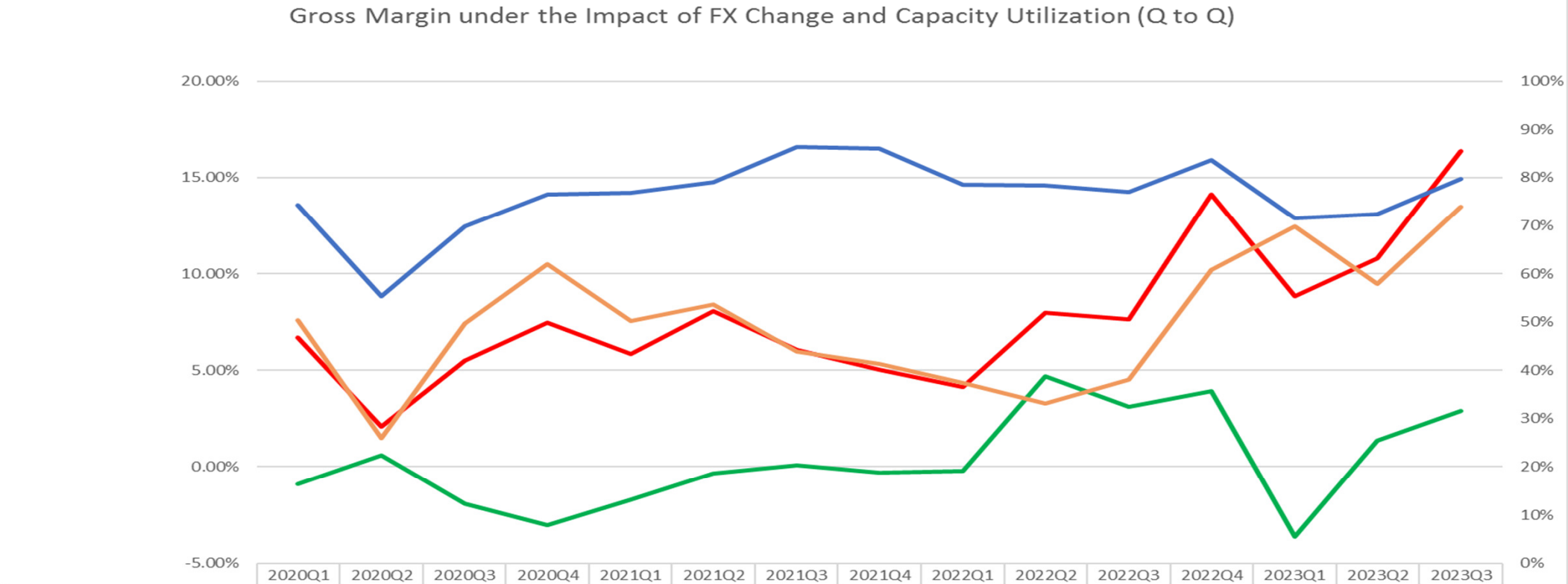
Simulated Gross Margin
= Previous Gross Margin + 0.8 * FX Impact

FX Impact
= 0.55* Percentage Change of USD/NTD
+ 0.35* Percentage Change of USD/CNY
+ 0.10* Percentage Change of USD/THB

Note:
1. Use the multiplier of 0.8 for FX Impact because 90% of our revenue are in USD and some purchase in USD provides partial natural hedge for our revenue in USD.
2. Appreciation of USD/NTD, USD/CNY and USD/THB will have positive impact on our gross margin and depreciation of USD/NTD, USD/CNY and USD/THB will have negative impact on our gross margin. The multipliers of 0.55, 0.35 and 0.10 mean our production allocation factors of Taiwan, China and Thailand.

Gross Margin, FX Impact, Capacity Utilization 1

Perspective 1

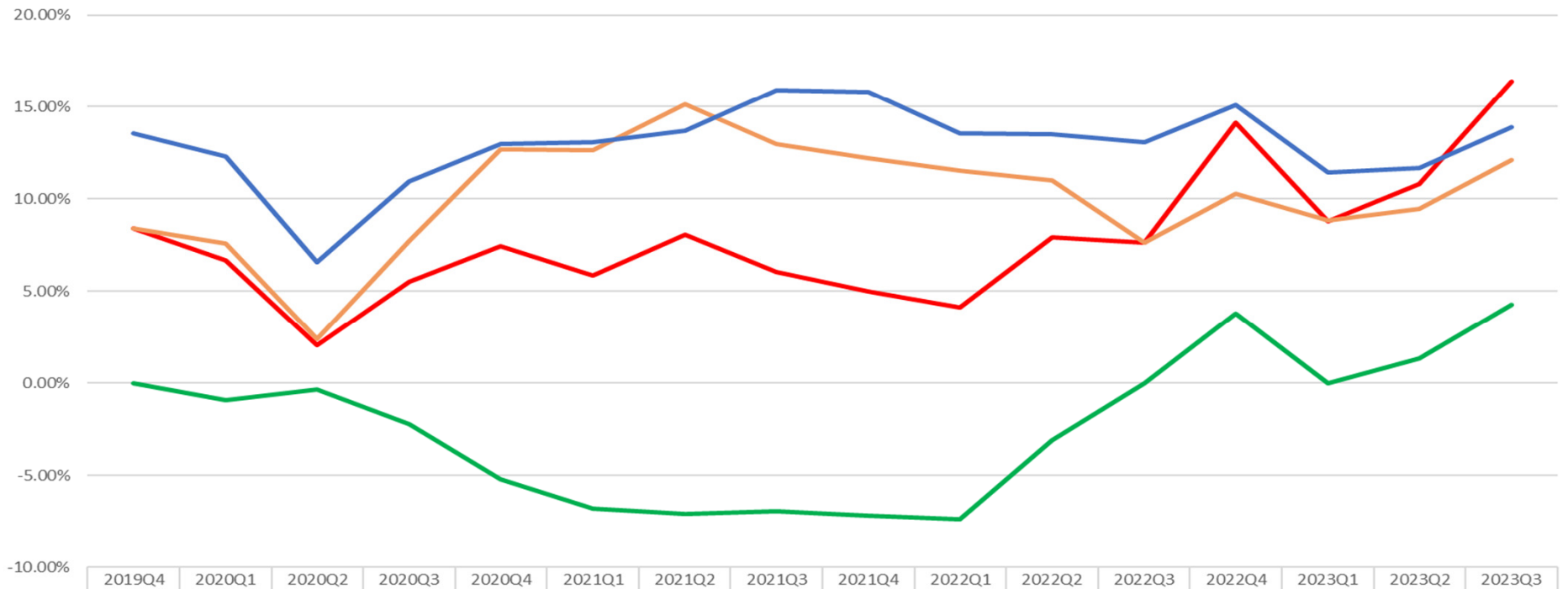


	2020Q1	2020Q2	2020Q3	2020Q4	2021Q1	2021Q2	2021Q3	2021Q4	2022Q1	2022Q2	2022Q3	2022Q4	2023Q1	2023Q2	2023Q3
FX Impact	-0.92%	0.59%	-1.91%	-3.04%	-1.70%	-0.33%	0.10%	-0.30%	-0.20%	4.67%	3.11%	3.91%	-3.64%	1.35%	2.91%
Gross Margin	6.69%	2.08%	5.50%	7.47%	5.86%	8.07%	6.06%	5.01%	4.14%	7.95%	7.63%	14.11%	8.81%	10.80%	16.38%
GM minus FX Impact	7.60%	1.49%	7.41%	10.51%	7.56%	8.40%	5.96%	5.31%	4.33%	3.29%	4.53%	10.20%	12.45%	9.45%	13.47%
Capacity Utilization (left)	74%	55%	70%	77%	77%	79%	86%	86%	78%	78%	77%	84%	72%	72%	80%

Gross Margin, FX Impact, Capacity Utilization 2

Perspective 2

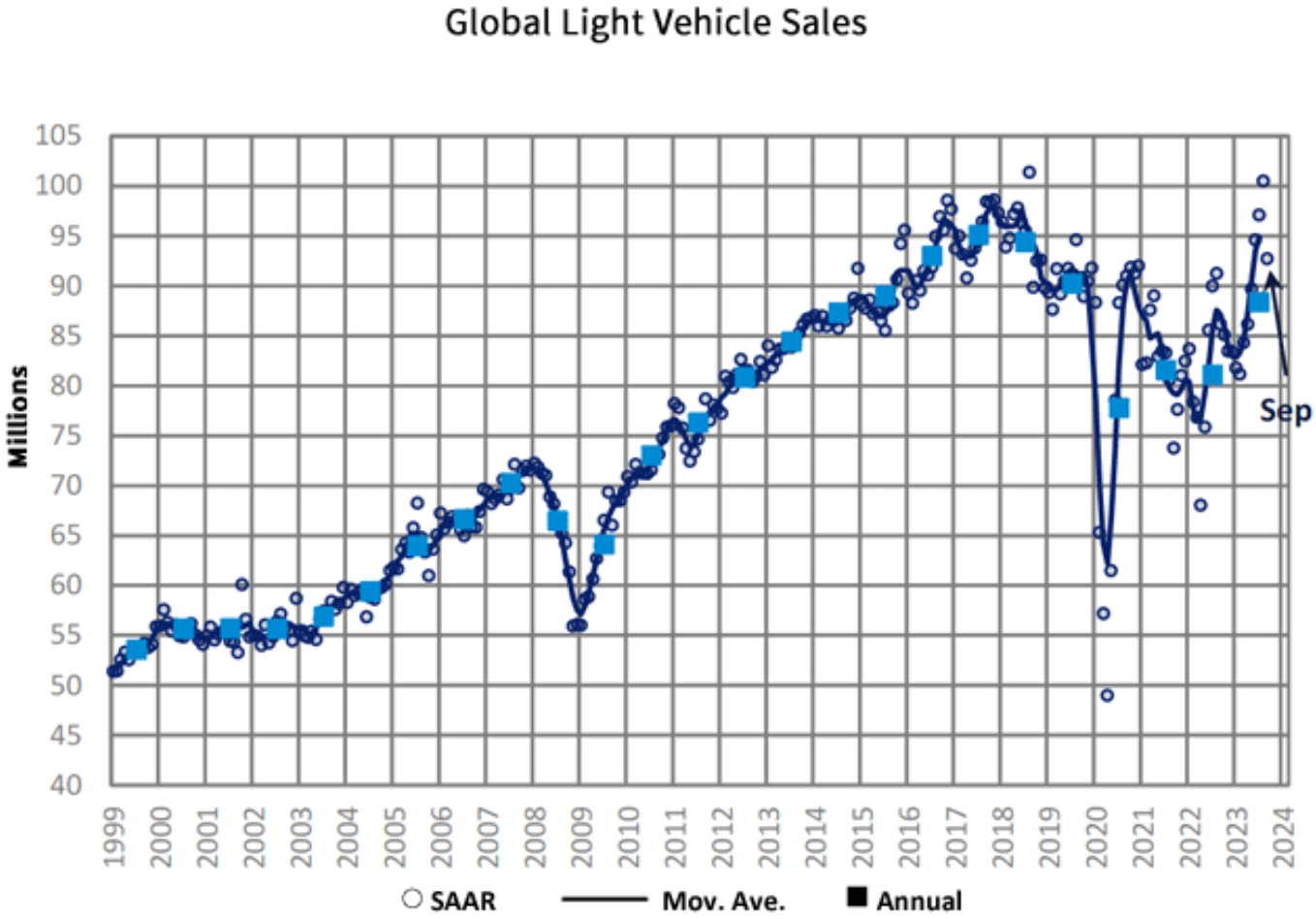
Gross Margin under the Impact of FX Change and Capacity Utilization (Base 100 = 2019Q4)



	2019Q4	2020Q1	2020Q2	2020Q3	2020Q4	2021Q1	2021Q2	2021Q3	2021Q4	2022Q1	2022Q2	2022Q3	2022Q4	2023Q1	2023Q2	2023Q3
FX Impact	0.00%	-0.92%	-0.32%	-2.23%	-5.20%	-6.81%	-7.08%	-6.94%	-7.19%	-7.38%	-3.07%	-0.03%	3.81%	-0.01%	1.33%	4.26%
Gross Margin	8.41%	6.69%	2.08%	5.50%	7.47%	5.86%	8.07%	6.06%	5.01%	4.14%	7.95%	7.63%	14.11%	8.81%	10.80%	16.38%
GM minus FX Impact	8.41%	7.60%	2.40%	7.73%	12.67%	12.67%	15.16%	13.00%	12.20%	11.52%	11.02%	7.66%	10.30%	8.83%	9.47%	12.12%
Capacity Utilization (left)	79%	74%	55%	70%	77%	77%	79%	86%	86%	78%	78%	77%	84%	72%	72%	80%

Global Auto Market

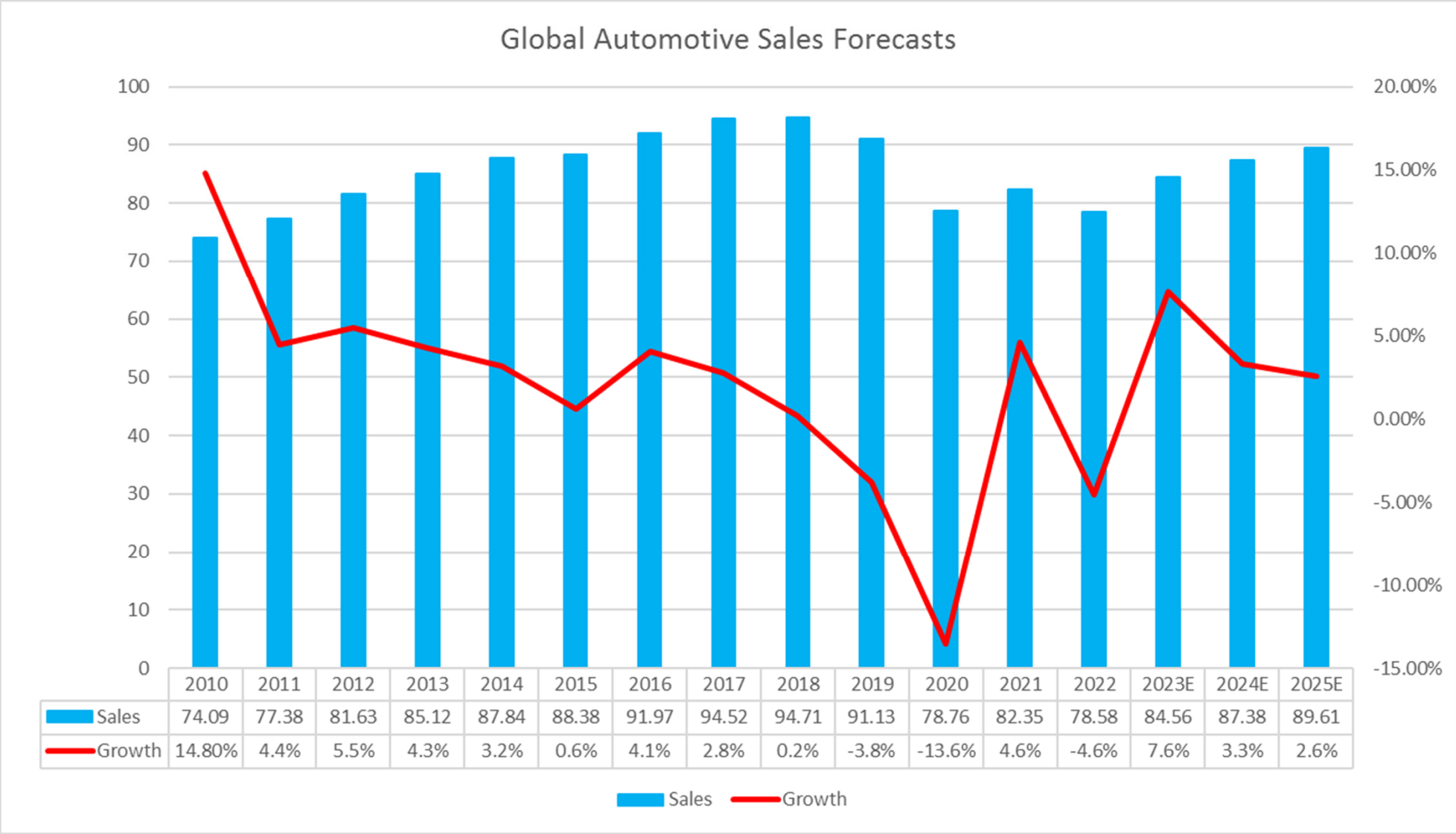
Global Automotive Market



The Global Light Vehicle (LV) selling rate ended its 6-month rising streak by falling to 93 mn units/year in September, from a revised figure of 100 mn units in August. With 8 mn units sold in September, the global LV market has grown 8.5% YoY. Year-to-date (YTD), there have been 66 mn units sold, marking an increase of 10.2% YoY.

Sources: GlobalData Global Light Vehicle Sales Update
https://www.marklines.com/en/report/global_report_202309

Global Automotive Sales Forecasts



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023E	2024E	2025E
Sales	74.09	77.38	81.63	85.12	87.84	88.38	91.97	94.52	94.71	91.13	78.76	82.35	78.58	84.56	87.38	89.61
Growth	14.80%	4.4%	5.5%	4.3%	3.2%	0.6%	4.1%	2.8%	0.2%	-3.8%	-13.6%	4.6%	-4.6%	7.6%	3.3%	2.6%

Sources: Nomura (July 2023)

How many cars in the world?

"By the end of the first quarter of 2022, there were approximately 1.45 billion vehicles in the world, of which about 1.1 billion are passenger cars."

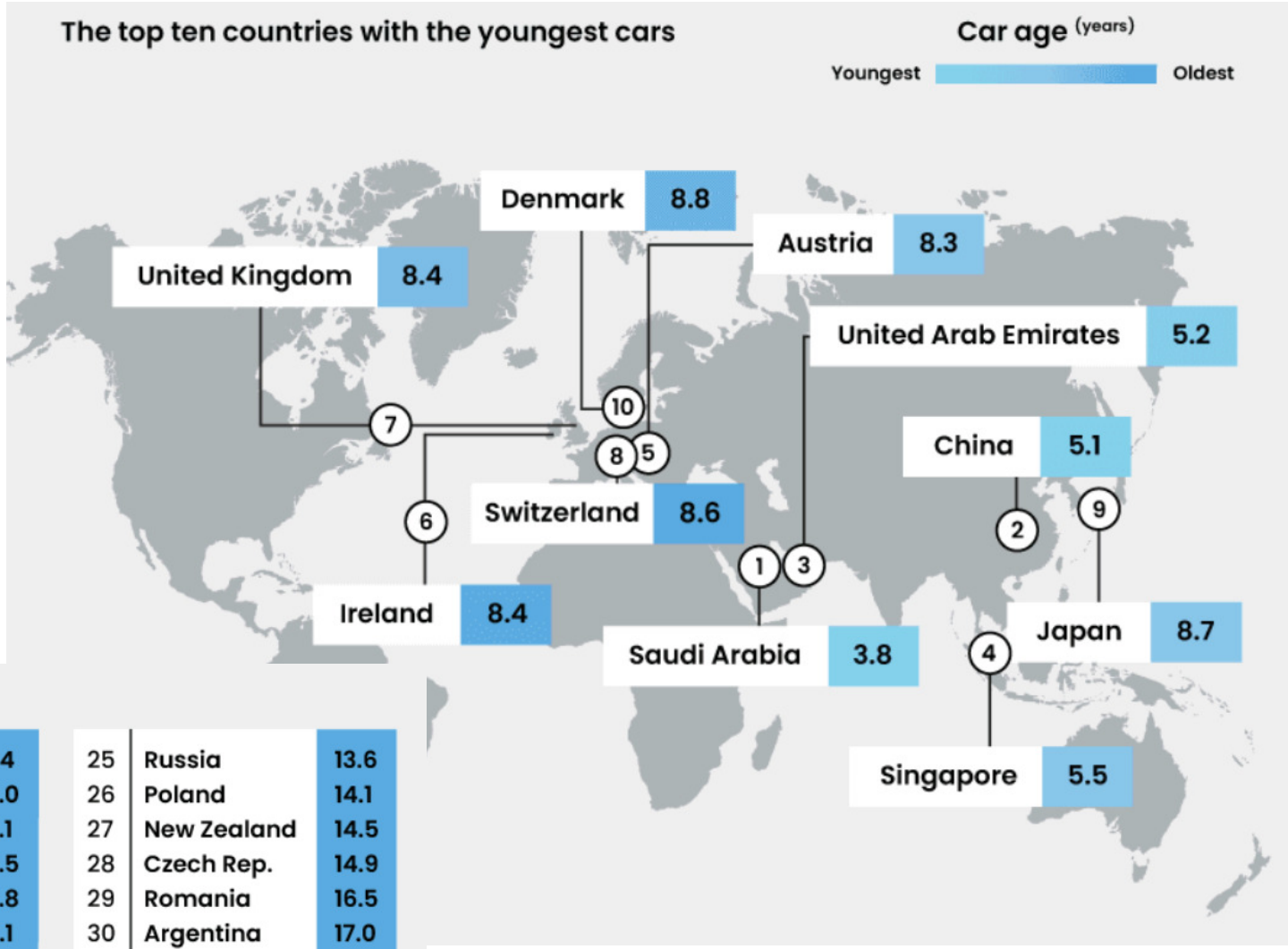
Sources:
https://www.whichcar.com.au/news/how-many-cars-are-there-in-the-world

Average Age of a Vehicle

"The average age of a vehicle in the US will hit 12.3 years in 2023, according to a projection by Hedges & Company. By contrast, the average age of a vehicle in Europe in 2022 is 11.8 years according to the ACEA."

Sources: https://hedgescompany.com/blog/2022/02/how-old-are-cars/

Average Age of a Vehicle by Region



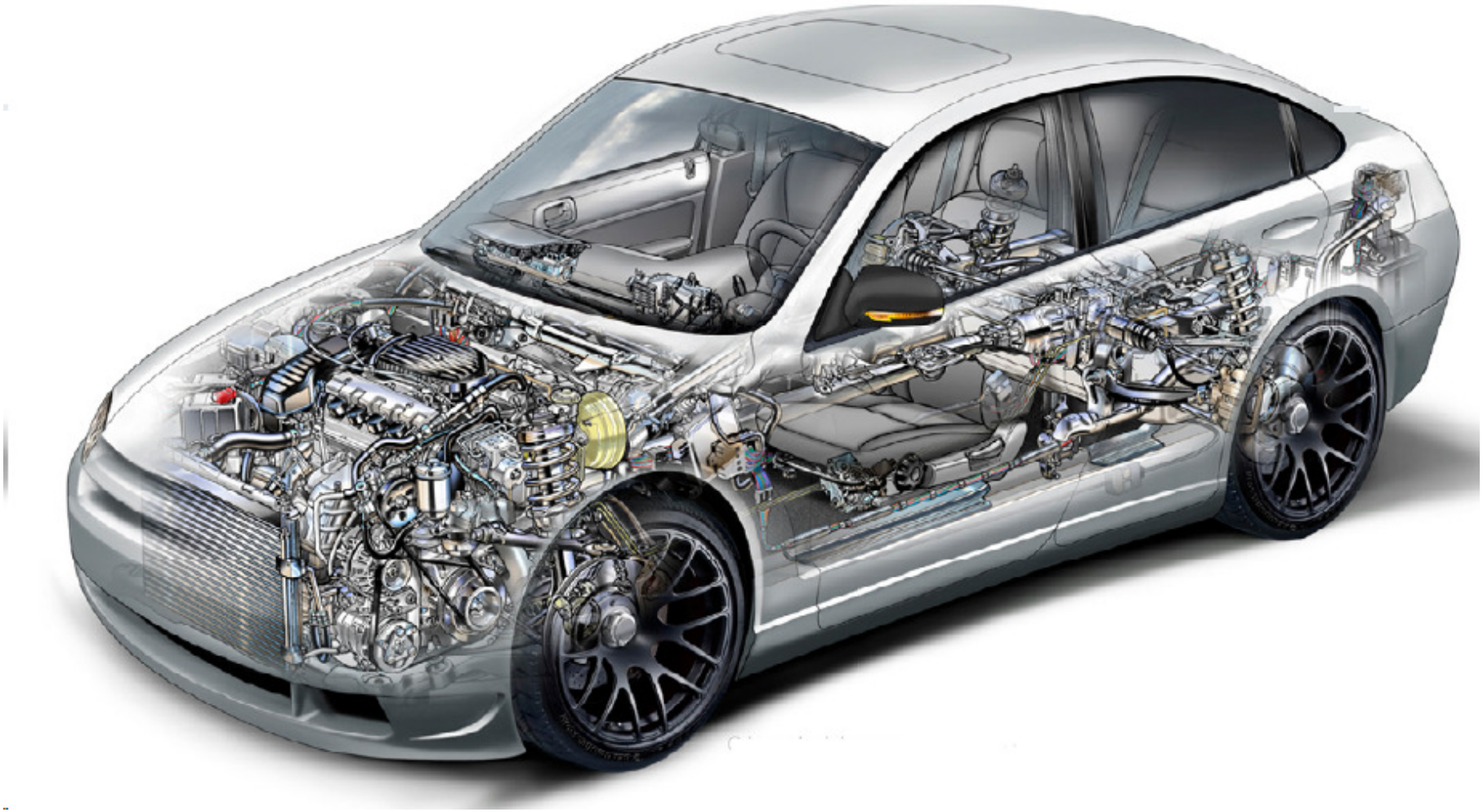
Here's how the rest rank

11	Belgium	9.1	18	Italy	11.4	25	Russia	13.6
12	Germany	9.6	19	Mexico	12.0	26	Poland	14.1
13	Australia	9.9	20	United States	12.1	27	New Zealand	14.5
14	Sweden	10.0	21	Finland	12.5	28	Czech Rep.	14.9
15	France	10.2	22	Portugal	12.8	29	Romania	16.5
16	Norway	10.7	23	Spain	13.1	30	Argentina	17.0
17	Netherlands	11.0	24	Turkey	13.4			

Sources: https://www.confused.com/car-insurance/average-cars-around-the-world

Global EV Outlook

ICE Vehicle

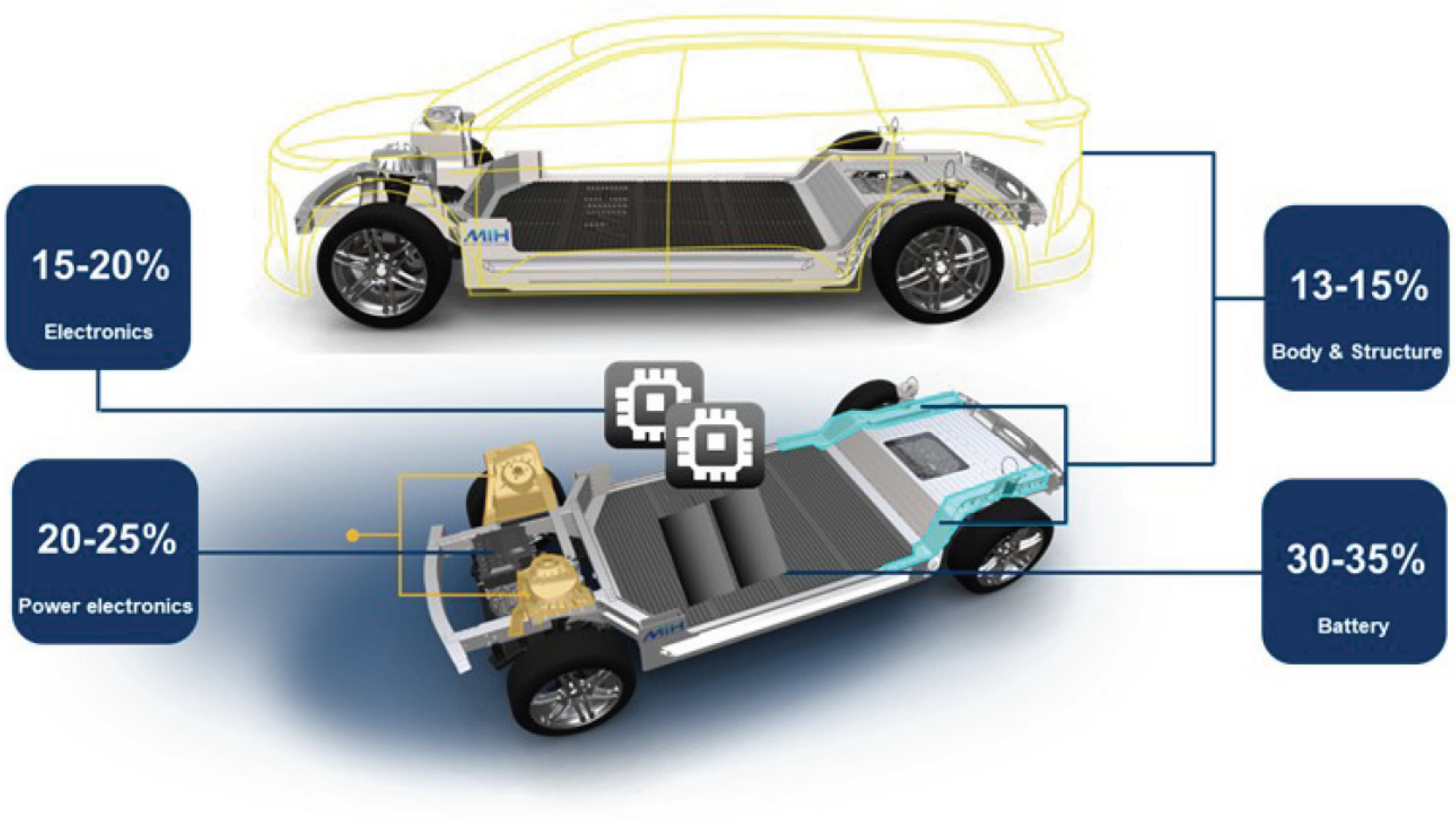


Sources: Avendus July 2020

Electric Vehicle: VW ID.4

Sources: https://insideevs.com/news/514802/volkswagen-id4-awd-prices-specs/?utm_source=RSS&utm_medium=referral&utm_campaign=RSS-all-articles

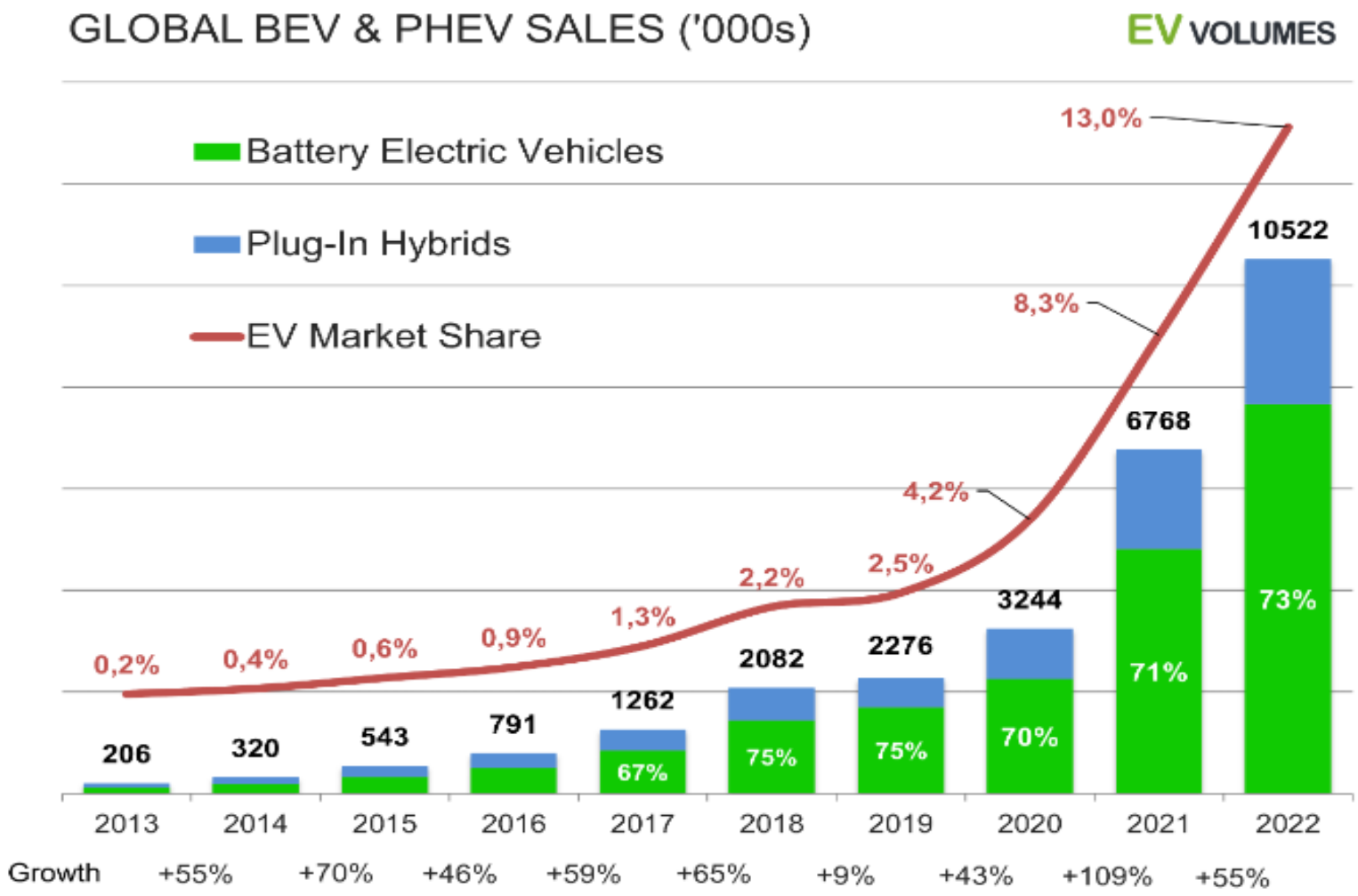
EV Cost Breakdown by Key Components



Source: Hon Hai, Morgan Stanley Research

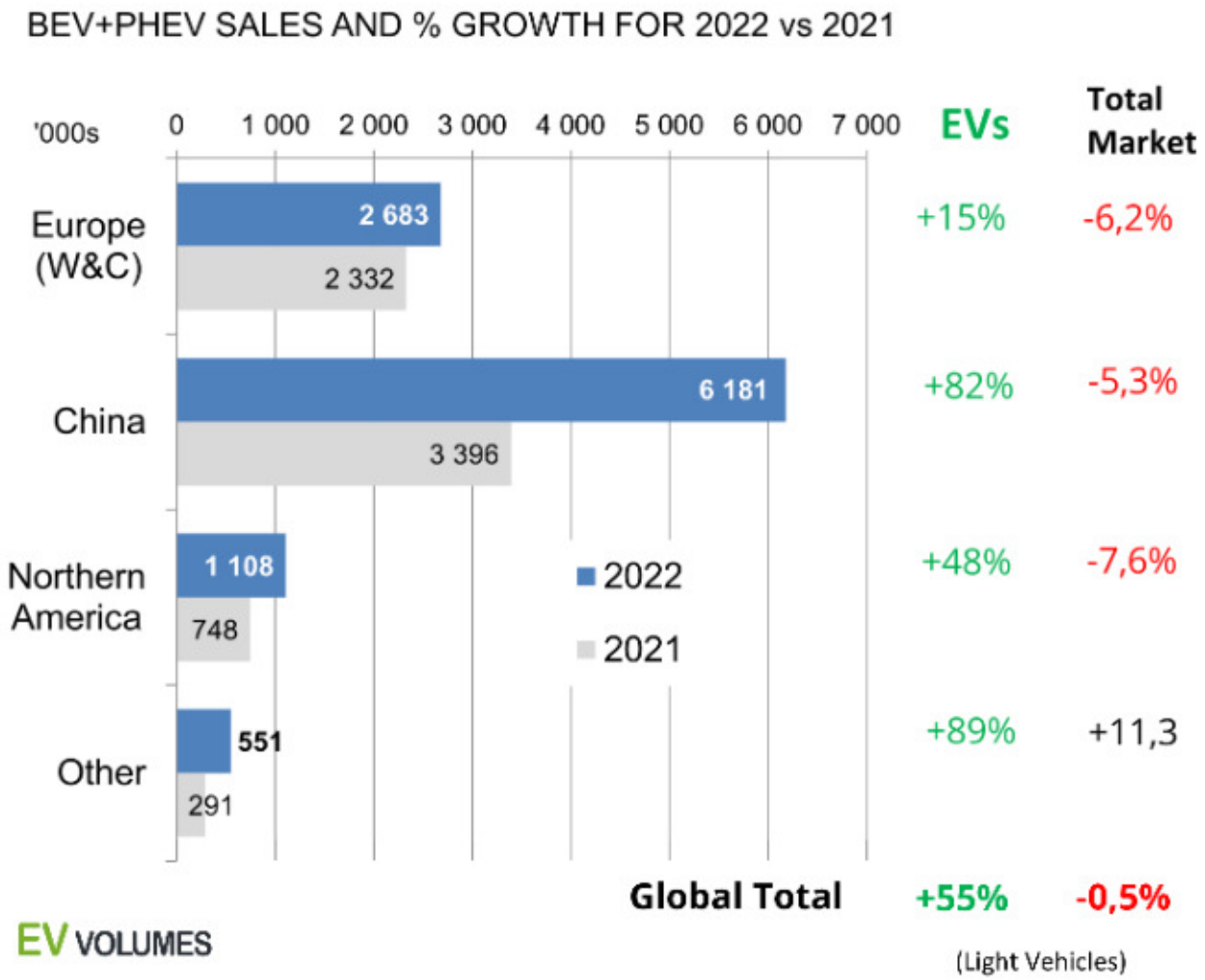
Sources: Morgan Stanley August 2022

Global EV Sales: the Past



Sources: ev-volumes.com 2023

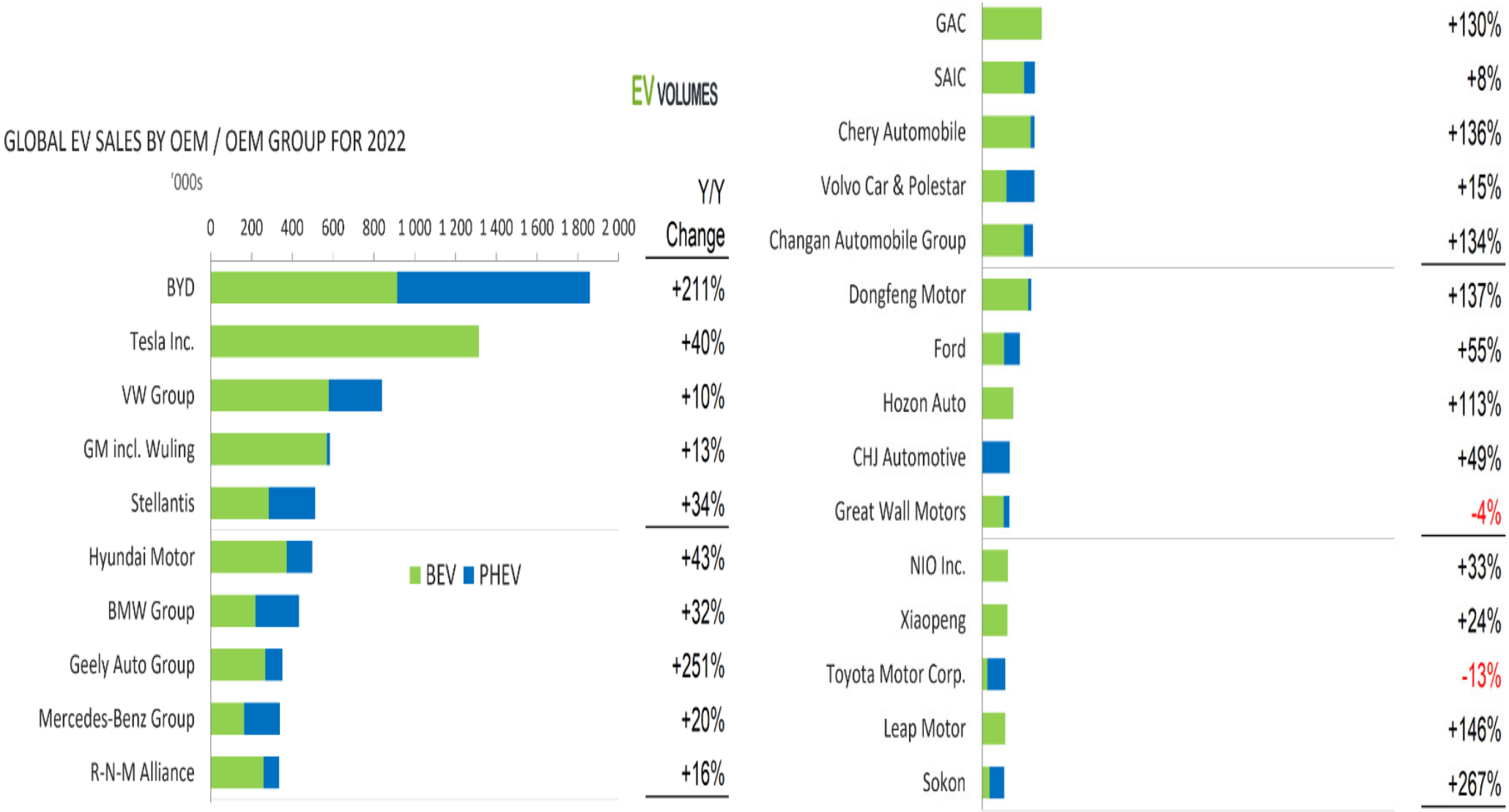
Global EV Sales by Region: 2022



10.5 million electric vehicles were sold in 2022. China's sales ranked first. Europe's was second, but only 43% of China's.

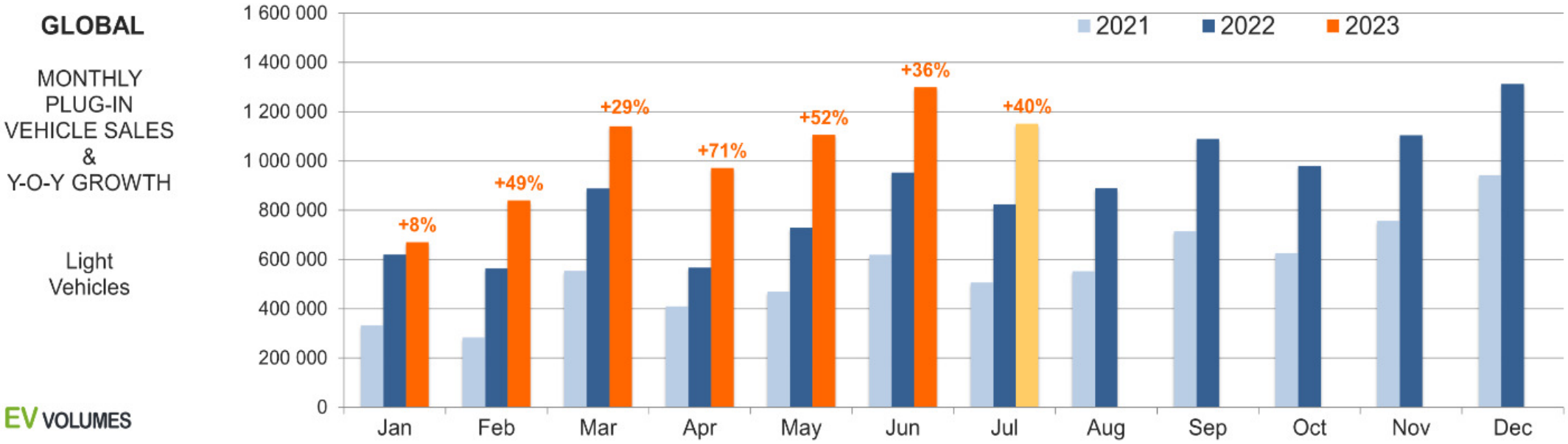
Sources: ev-volumes.com 2023

Global EV Sales by Manufacturer: 2022



Sources: ev-volumes.com 2023

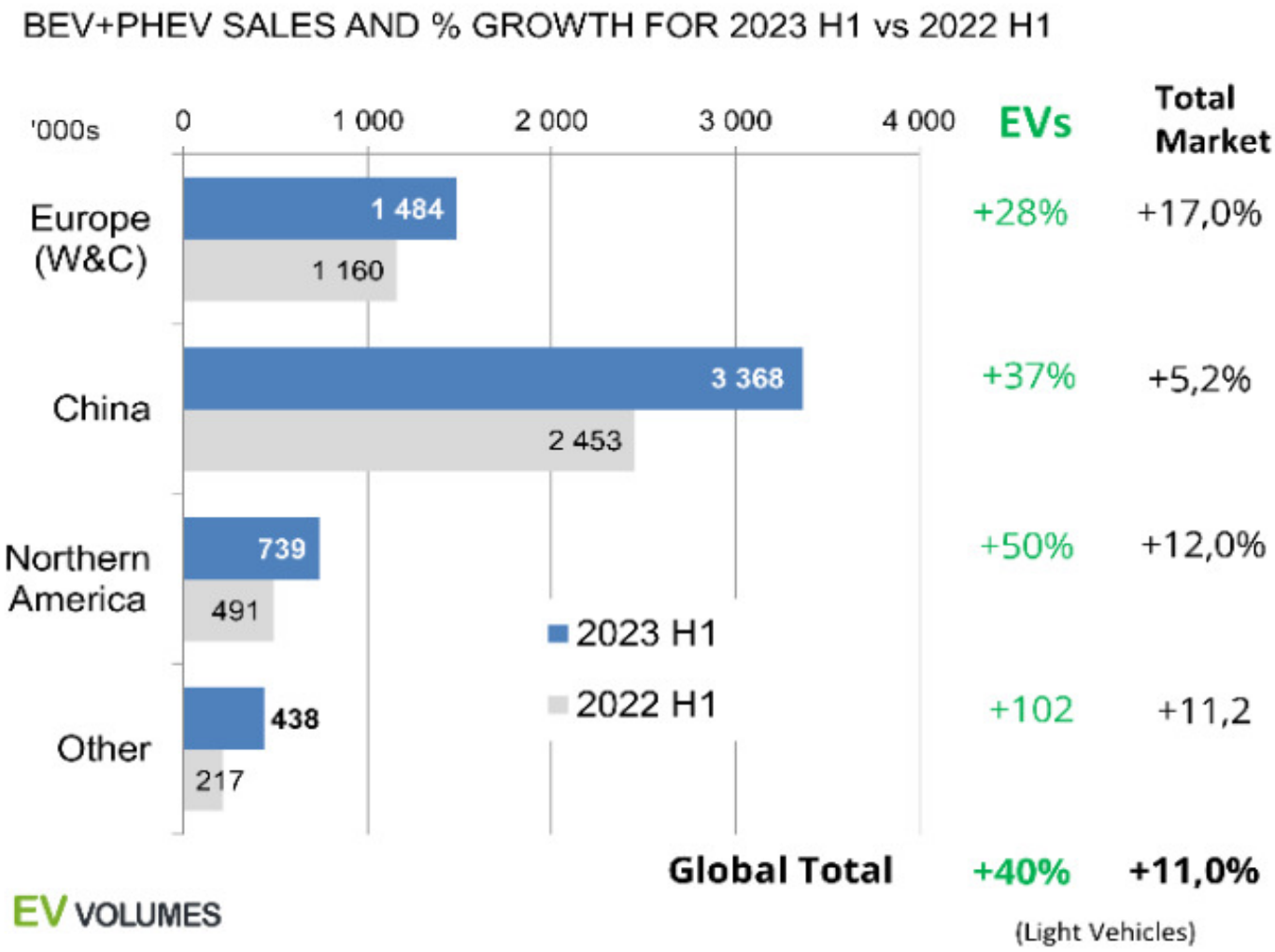
Global EV Sales by Month: 2023H1



Global EV sales continue strong. A total of 6 million new Battery Electric Vehicles (BEV) and Plug-in Hybrids (PHEV) were delivered during the first half of 2023, an increase of 40 %. 4,27 million were pure electric BEVs and 1,76 million were PHEVs. However, if sales in the first half of 2023 are compared with those in the second half of 2022, they decreased by 3%.

Sources: ev-volumes.com 2023

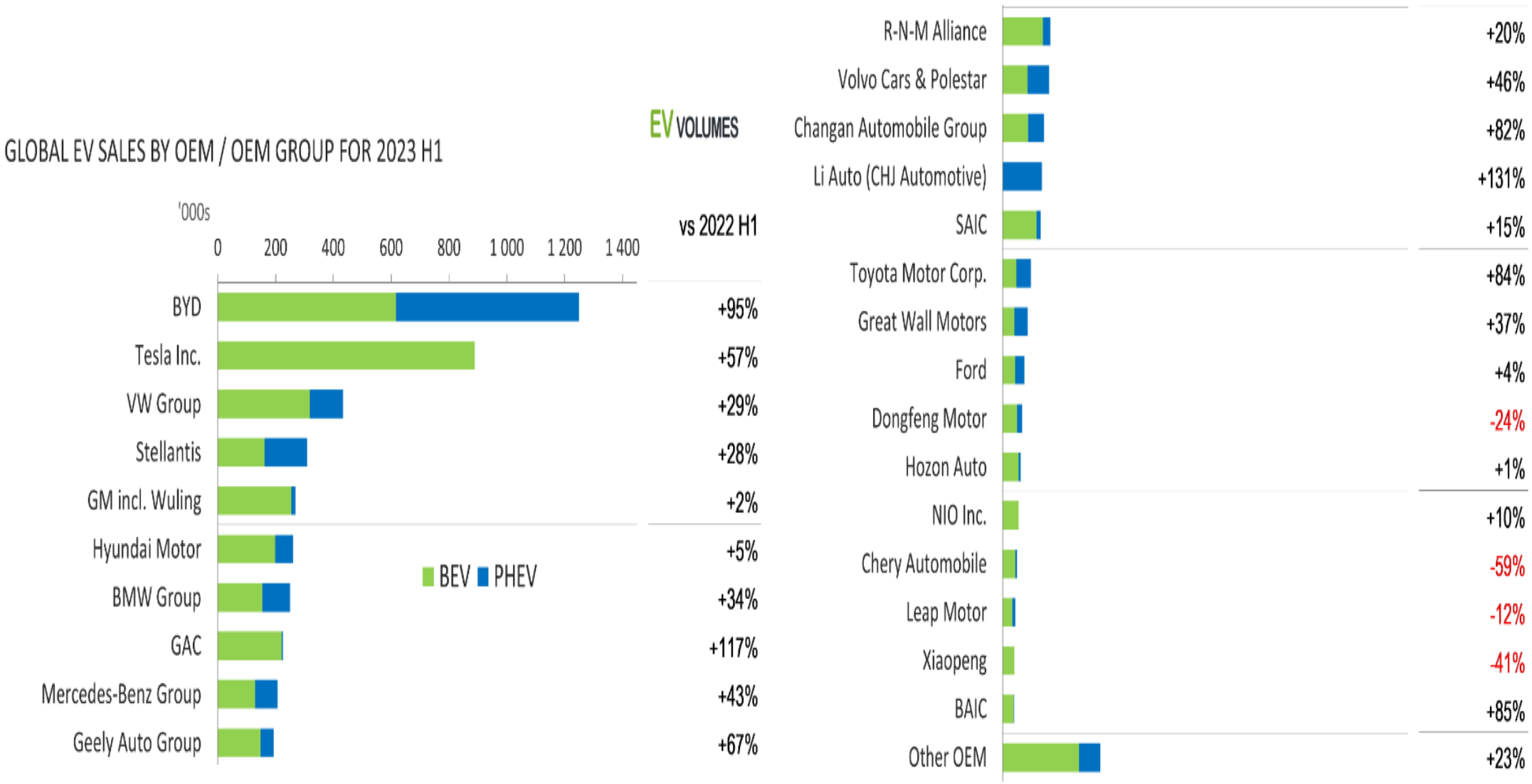
Global EV Sales by Region: 2023H1



6.029 million electric vehicles were sold in 2023H1. China's sales ranked first. Europe's was second, but only 44% of China's.

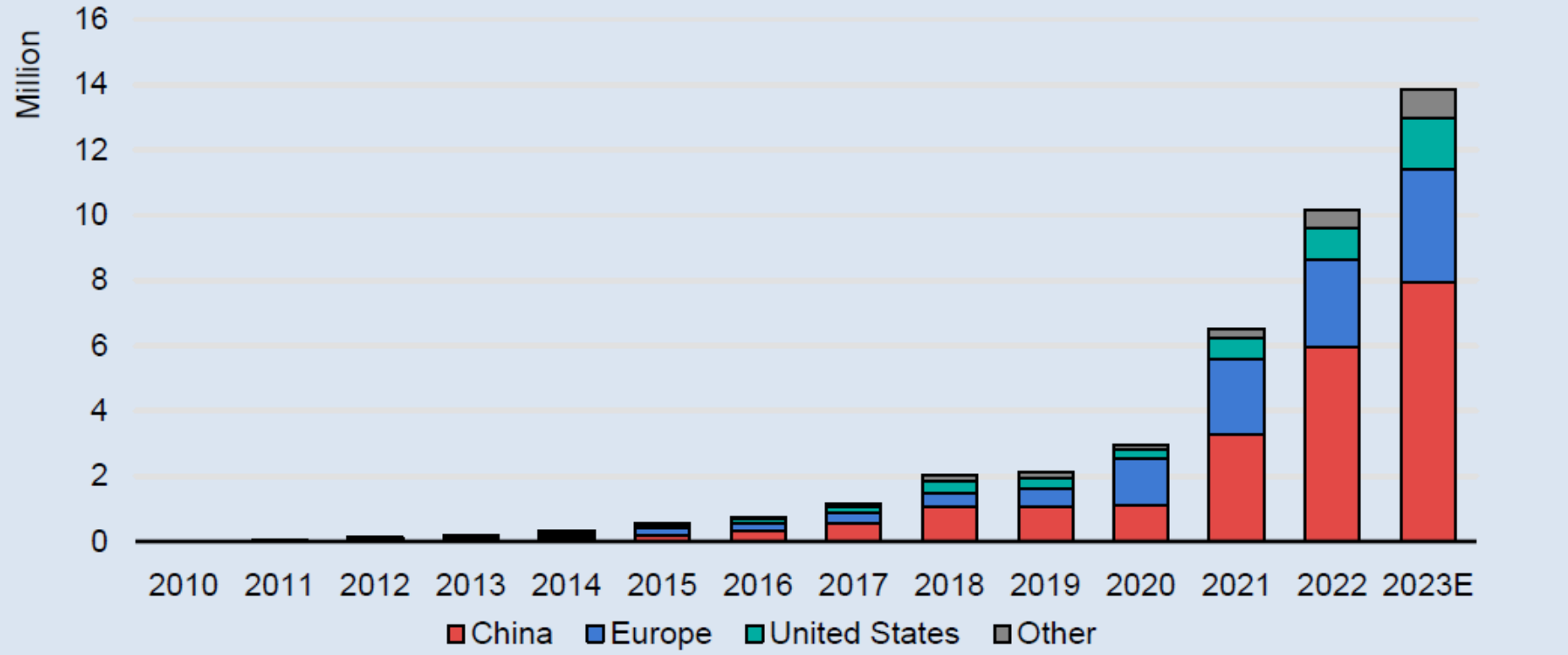
Sources: ev-volumes.com 2023

Global EV Sales by Manufacturer: 2023H1



Sources: ev-volumes.com 2023

Global EV Sales 2023: the Future 1



Note: 2023 sales ("2023E") are estimated based on market trends through the first quarter of 2023.
Source: IEA analysis based on EV Volumes.

Sources: Global EV Outlook 2023 (IEA April 2023)

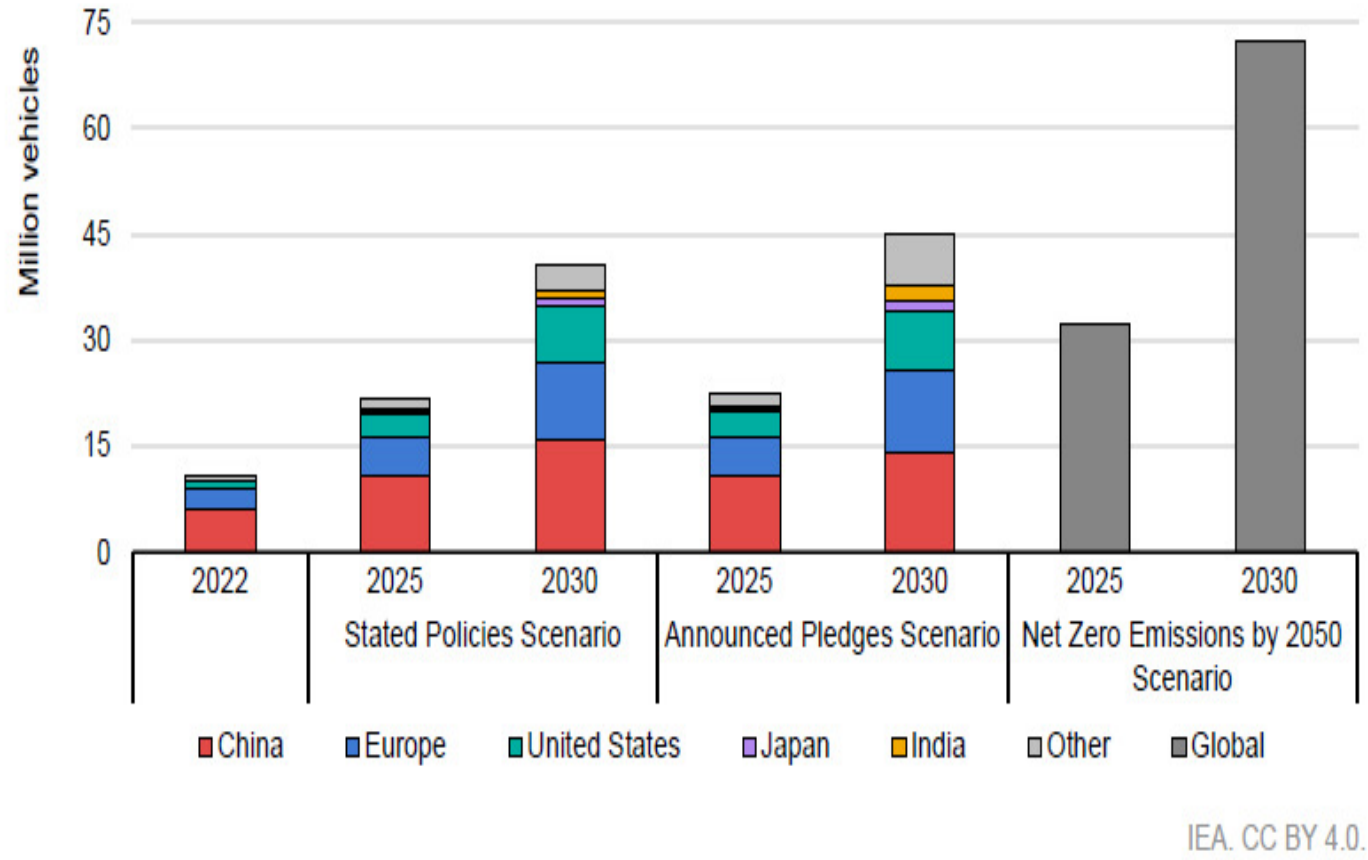
Global EV Sales 2023: the Future 2

Globally, our current estimate is therefore for nearly 14 million electric cars to be sold in 2023, building on the more than 2.3 million already sold in the first quarter of the year. This represents a 35% increase in electric car sales in 2023 compared to 2022 and would bring the global electric sales share to around 18%, up from 14% in 2022.

Sources: Global EV Outlook 2023 (IEA April 2023)

Global EV Sales 2022~2030: the Future 3

Figure 3.2. Electric vehicle sales by region, 2022-2030



Global EV sales increase around fourfold from 2022 to 2030 under both stated policies and announced ambitions.

In the Stated Policies Scenario, total EV sales reach 20 million in 2025 and 40 million vehicles in 2030, representing respectively 20% and 30% of all vehicle sales.

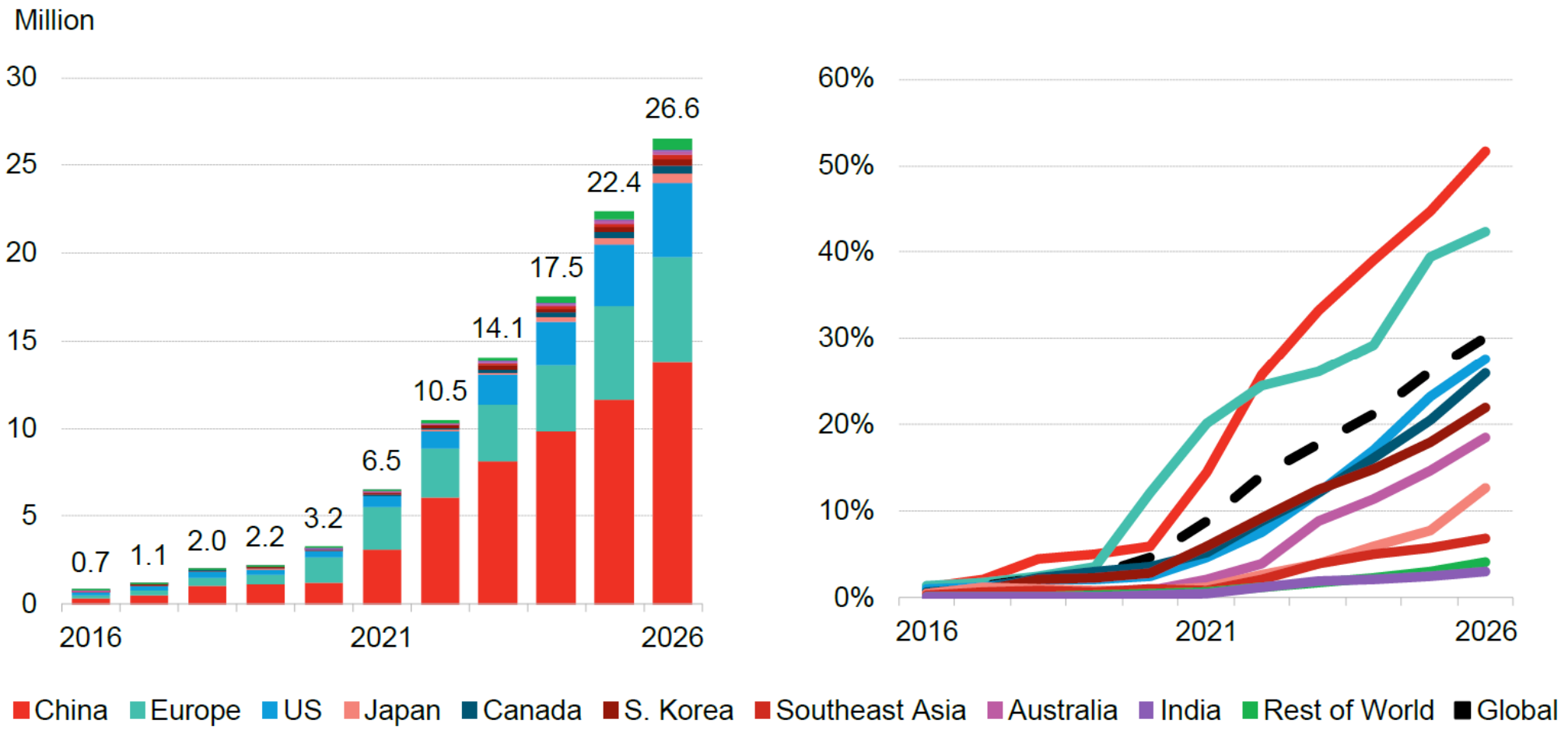
In the Announced Pledges Scenario, based on the targets and pledges that go beyond stated policies, the global EV sales reach beyond 22 million in 2025 and an 45 million vehicles in 2030, achieving a sales share of over 35% in 2030.

For comparison, in the Net Zero Scenario, the global EV sales reach over 30 million in 2025 and over 70 million vehicles in 2030, representing respectively 30% and 60% of all vehicle sales.

Sources: Global EV Outlook 2023 (IEA April 2023)

Global EV Sales 2023: the Future 4

Global near-term passenger EV sales and share of new passenger vehicle sales by market

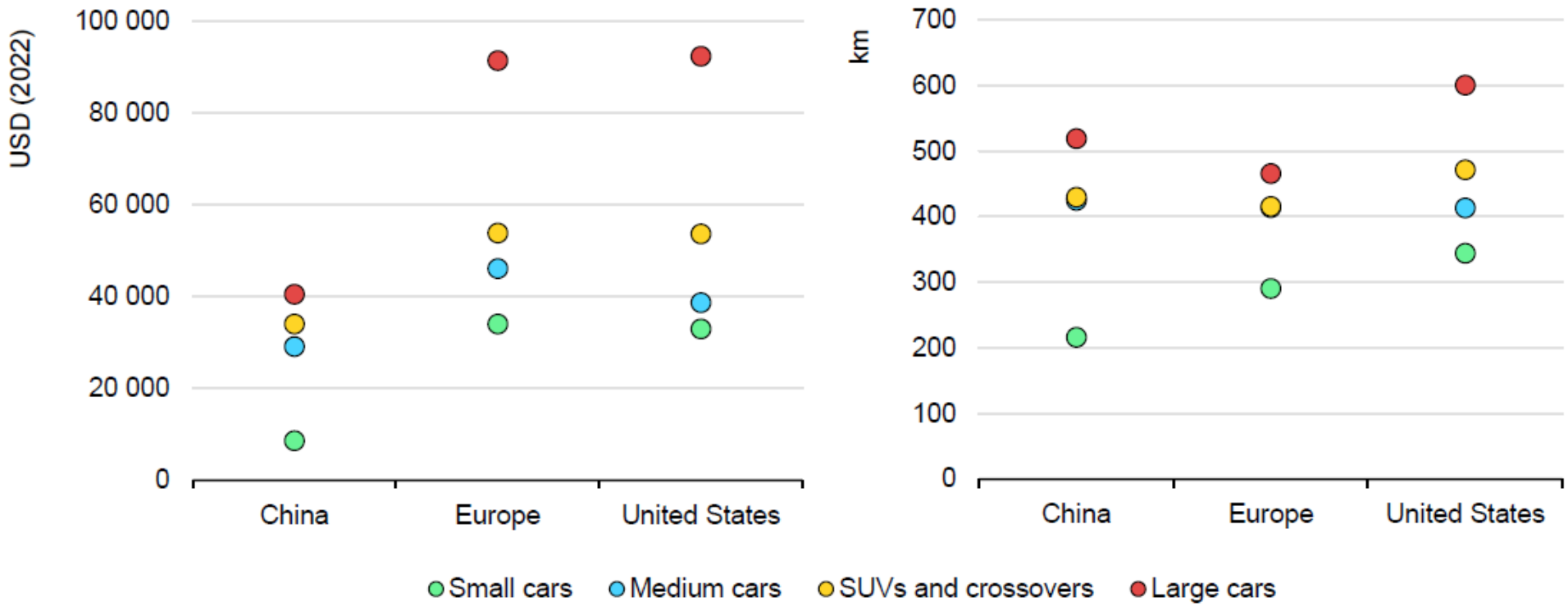


Source: BloombergNEF. Note: Europe includes the EU, the UK and EFTA countries. EV includes BEVs and PHEVs.

Sources: BloombergNEF's 2023 Electric Vehicle Outlook (Bloomberg Finance L.P.2023)

Average Retail Price and Driving Range in 2022

Figure 1.7 Sales-weighted average retail price (left) and driving range (right) of BEV passenger cars in selected countries, by size, in 2022



IEA. CC BY 4.0.

Notes: BEV = battery electric vehicle; SUV = sports utility vehicle. 'Europe' is based on data only from France, Germany and the United Kingdom. Retail prices collected in 2022-2023, before subsidy.

Source: IEA analysis based on EV Volumes.

Sources: Global EV Outlook 2023 (IEA April 2023)

How many EVs can be made by 1 GWh? 1

Battery Capacity	kWh per vehicle	how many vehicles
1 GWh	100	10,000
1 GWh	80	12,500
1 GWh	70	14,285
1 GWh	60	16,666
1 GWh	50	20,000

Note:

1. A Watt Hour (Wh) is a unit of measurement for power over a period of time (an hour), or in our case, a way of measuring capacity. One Watt hour is equal to one Watt of average power flow over an hour, which is 3600 joules.
2. The average price of battery was USD 150 per kWh in 2022. (IEA April 2023)
3. In 2022, the sales-weighted average battery size of small battery electric cars ranged from 25 kWh in China to 35 kWh across France, Germany and the United Kingdom, and about 60 kWh in the United States. In comparison, the average for battery electric SUVs was around 70-75 kWh in these countries, and within the 75-90 kWh range for large car models. (IEA April 2023)

How many EVs can be made by 1 GWh? 2

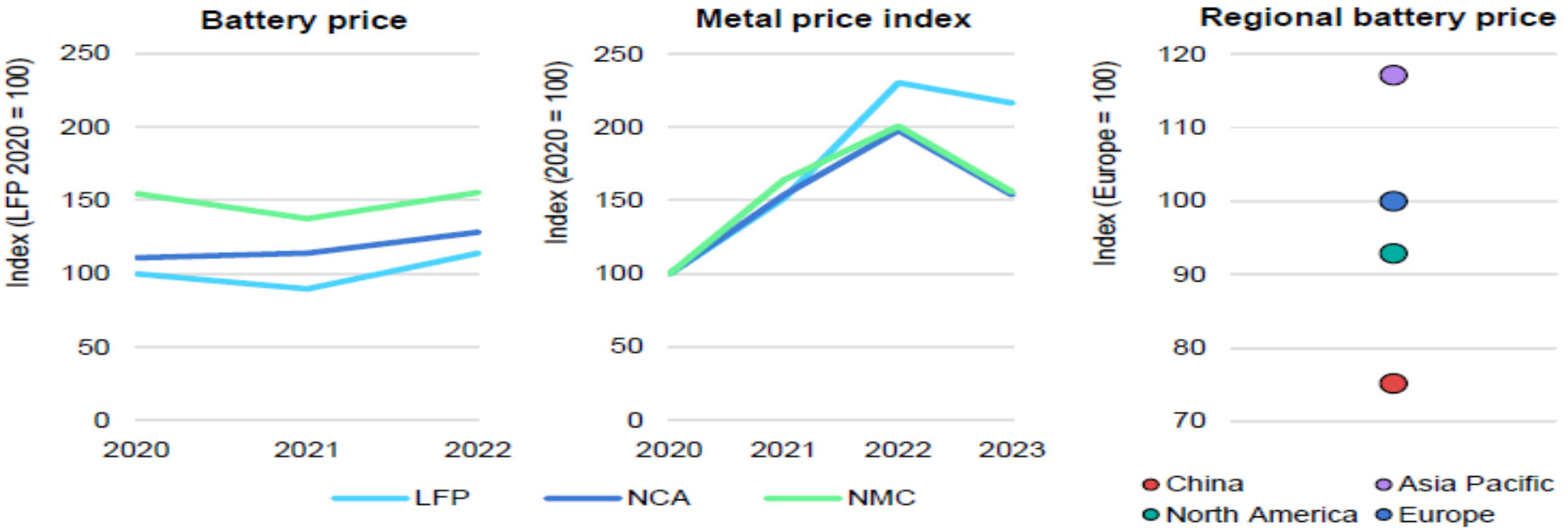
Battery Capacity	kWh per vehicle	how many vehicles
1 GWh	100	10,000
1 GWh	80	12,500
1 GWh	70	14,285
1 GWh	60	16,666
1 GWh	50	20,000

Note:

4. Globally, BEV models launched in 2022 had an average range of 337 kilometers, up from 230km in 2018. Average battery pack sizes have increased 10% annually over this period, going from 40kWh to 60kWh. Still, ranges remain below consumer expectations in most markets and segments, prompting automakers to launch longer-range models to ease range anxiety. (BloombergNEF's 2023 Electric Vehicle Outlook)

Battery Price 2020~2022

Figure 1.22 Price index for selected battery chemistries, regions and metal price, 2020-2023



IEA. CC BY 4.0.

Note: LFP = Lithium iron phosphate; NMC = Lithium nickel manganese cobalt oxide; NCA = Lithium nickel cobalt aluminium oxide. The metal price index is based on the price evolution of four commodities (lithium carbonate, cobalt, nickel and copper) weighted by their use in each battery chemistry. For this metal price index, NMC uses the NMC622 chemistry. The 2023 value of the metal price index covers only the first 3 months of the year. Asia Pacific excludes China. Regional battery (pack) price refers to 2022.

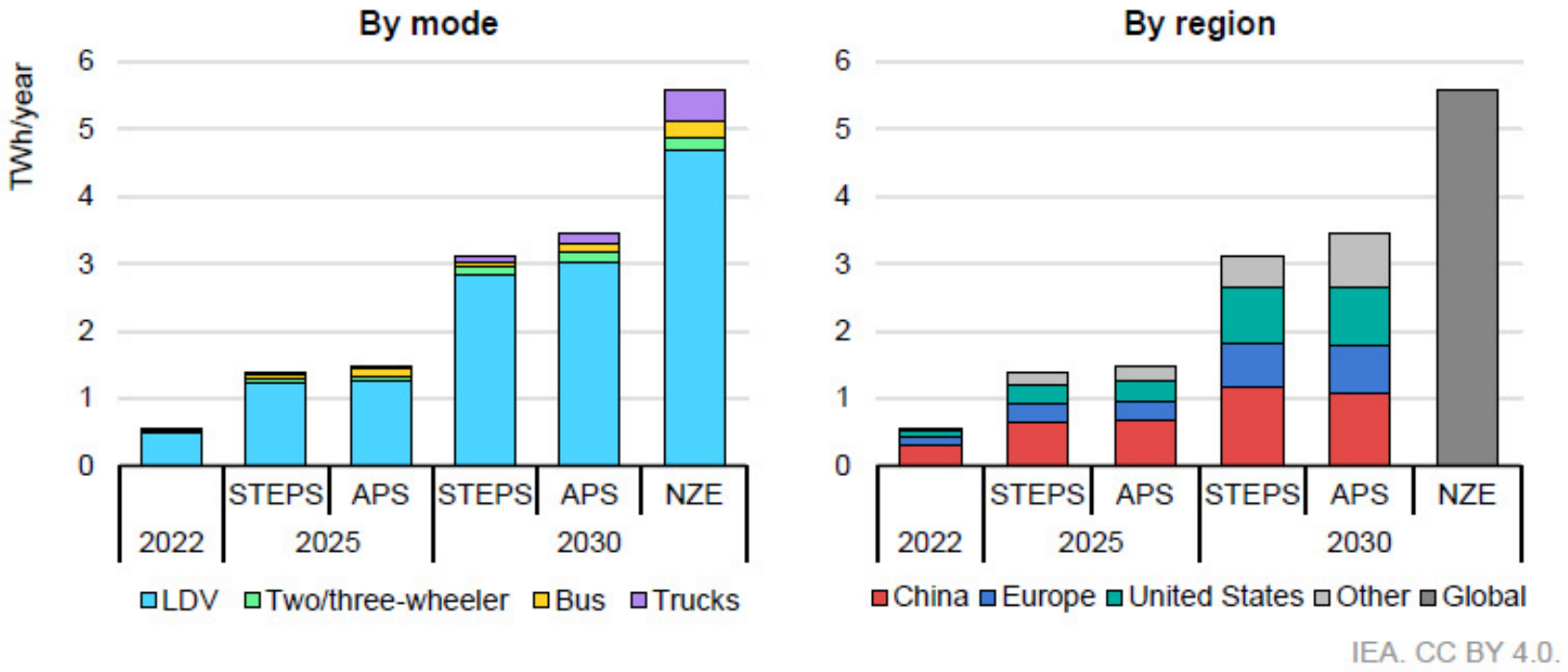
Source: IEA analysis based on material price data by S&P, 2022 Lithium-Ion Battery Price Survey by BNEF, BatPaC v4 by Argonne Laboratory and Lithium-Ion Batteries: State of the Industry 2022 by BNEF.

Despite a higher relative increase in price compared to other battery chemistries, LFP batteries remain the lowest price per kWh.

Sources: Global EV Outlook 2023 (IEA April 2023)

Global EV Battery Demand: the Future 1

Figure 3.7. Projected battery demand by mode and region, 2022-2030



Notes: STEPS = Stated Policies Scenario; APS = Announced Pledges Scenario; NZE = Net Zero Emissions by 2050 Scenario; LDV = light-duty vehicle.

Battery demand increases more than sixfold from 2022 to 2030 in the Announced Pledges Scenario and tenfold in the Net Zero Scenario.

Sources: Global EV Outlook 2023 (IEA April 2023)

Battery demand in 2030 reaches over 3 TWh per year in the Stated Policies Scenario and about 3.5 TWh per year in the Announced Pledges Scenario.

Global EV Battery Demand: the Future 2

Figure 12: Lithium-ion battery demand for passenger BEVs in China, the US and Europe by battery pack size scenario

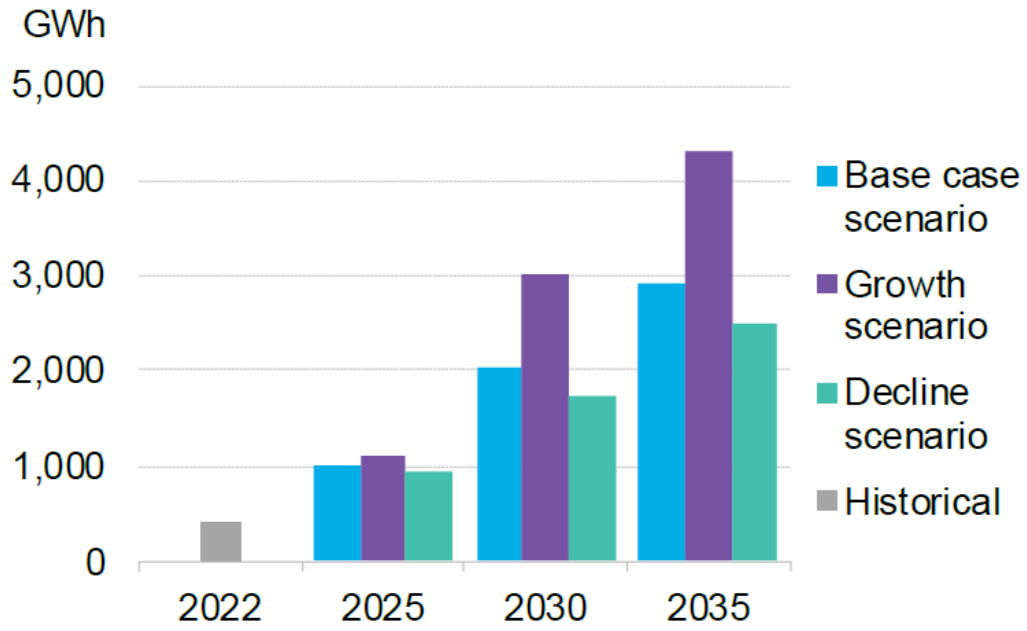
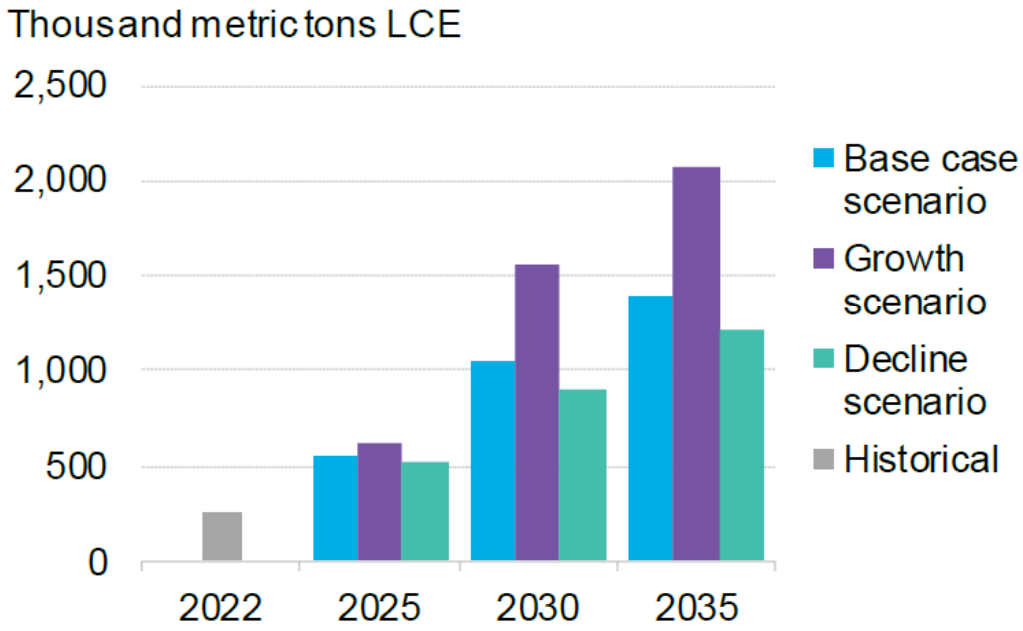


Figure 13: Lithium demand for passenger BEVs in China, the US and Europe by battery pack size scenario



Source: BloombergNEF. Note: Growth scenario assumes 5% growth in average BEV range from 2023 to 2030. Decline scenario assumes 2% annual decline in average range from 2025 onwards. Includes lithium carbonate and lithium hydroxide.

Battery demand in major areas in 2030 reaches around 2 TWh (= 2,000 GWh) per year in the Base Case Scenario and about 3 TWh (= 3,000 GWh) per year in the Growth Scenario.

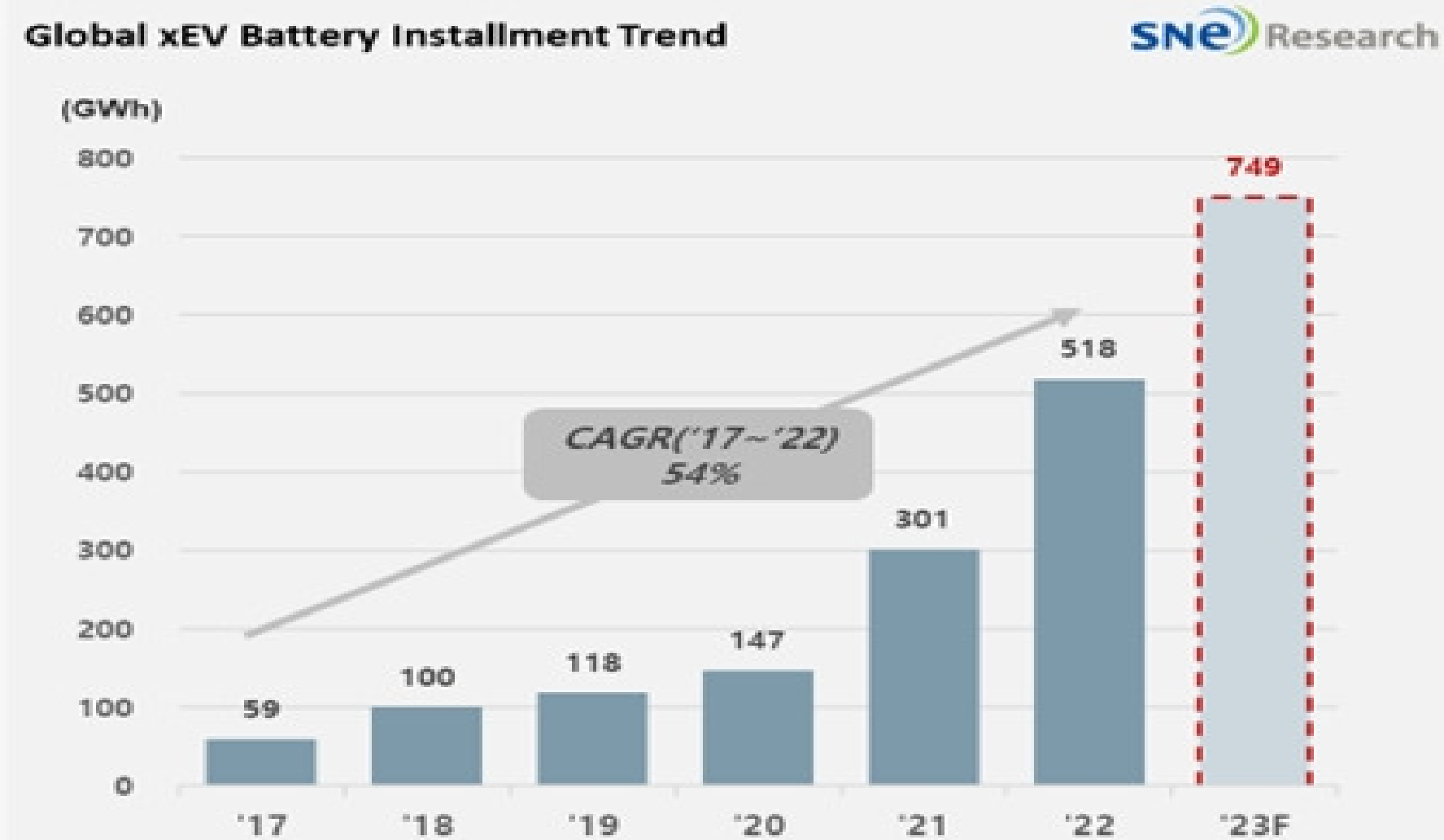
Sources: BloombergNEF's 2023 Electric Vehicle Outlook (Bloomberg Finance L.P.2023)

Global EV Battery Production Capacity 2021

Region	GWh	%
China	655	75.2%
EU	60	6.9%
USA	57	6.5%
Korea	41	4.7%
Japan	36	4.1%
Southeast Asia	8.7	1.0%
Other	13.3	1.5%
Total	871	100%

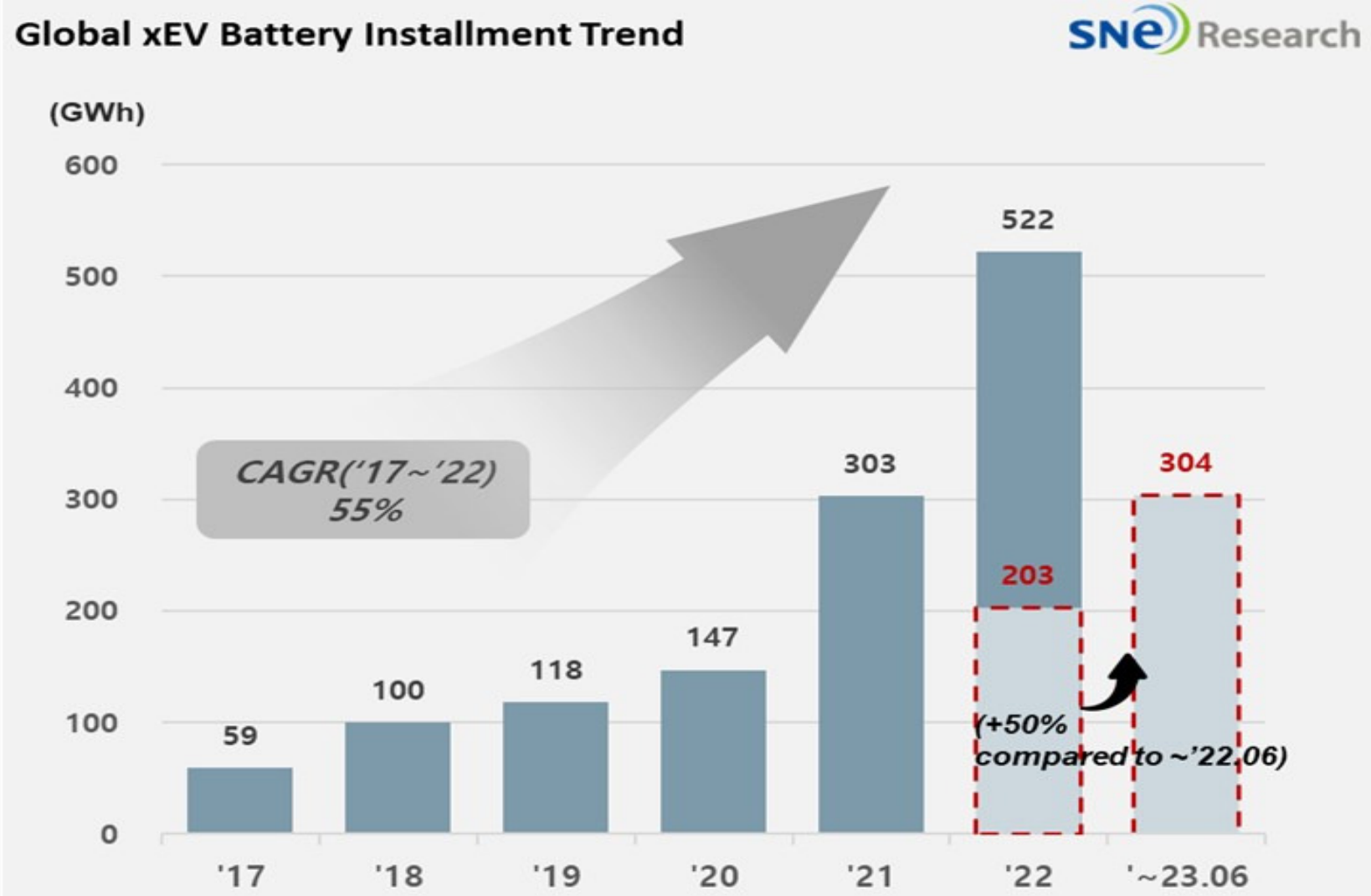
Sources: Global Supply Chains of EV Batteries (IEA July 2022)

2023 Global EV Battery Installment Trend 1



Sources: SNE Research January 2023
https://www.sneresearch.com/en/insight/release_view/68/page/0

2023 Global EV Battery Installment Trend 2



Sources: SNE Research August 2023
https://www.sneresearch.com/en/insight/release_view/150

2023 Global EV Battery Usage

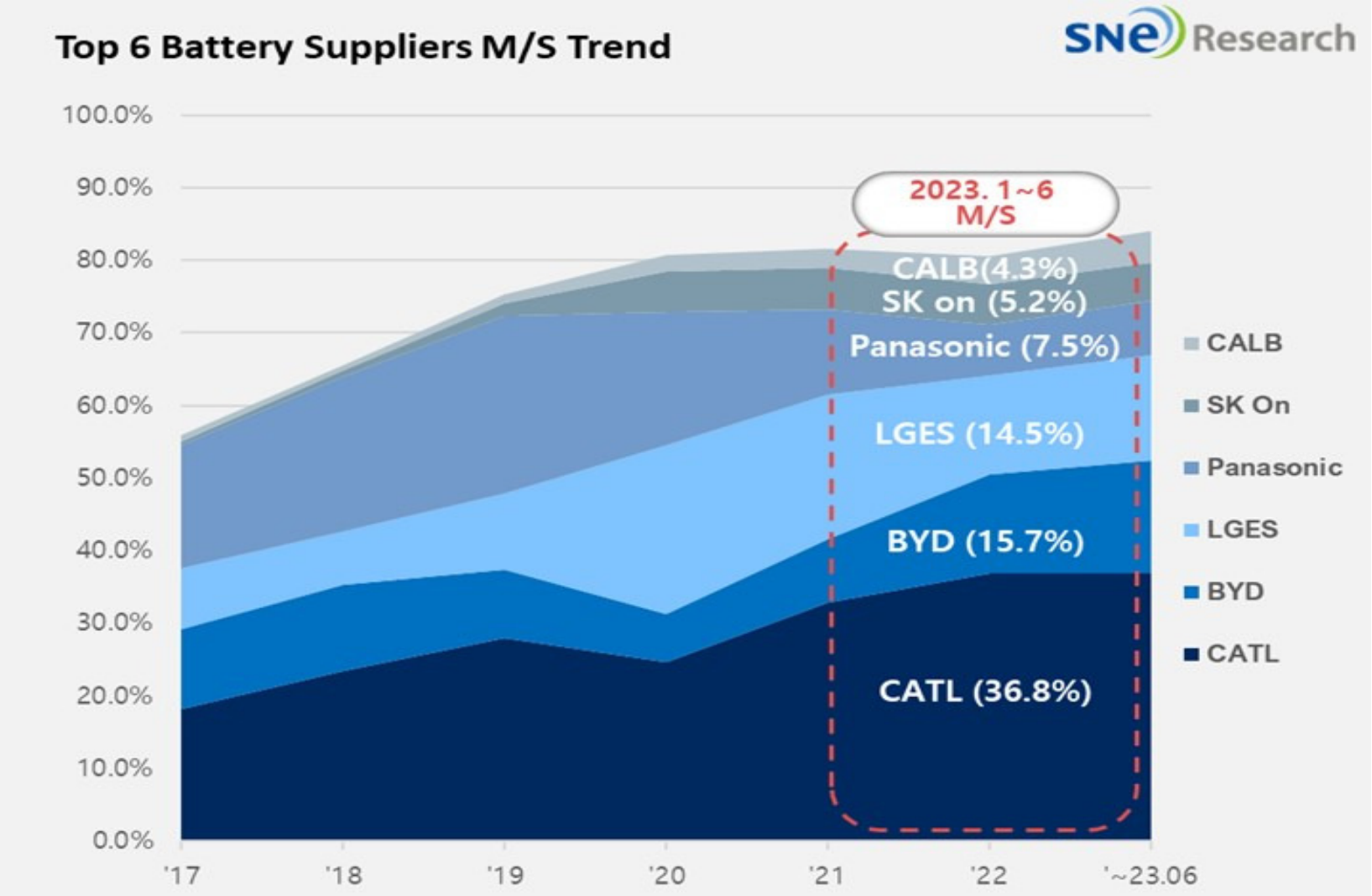
* Annual Cumulative Global Battery Usage for xEV (Unit: GWh)

Rank	Battery Supplier	2022. 1~6	2023. 1~6	Growth Rate	2022 M/S	2023 M/S
1	CATL	71.7	112.0	56.2%	35.4%	36.8%
2	BYD	23.6	47.7	102.4%	11.6%	15.7%
3	LG Energy Solution	29.3	44.1	50.3%	14.5%	14.5%
4	Panasonic	16.4	22.8	39.2%	8.1%	7.5%
5	SK On	13.7	15.9	16.1%	6.8%	5.2%
6	CALB	8.2	13.0	58.8%	4.1%	4.3%
7	Samsung SDI	9.8	12.6	28.2%	4.8%	4.1%
8	EVE	2.6	6.6	151.7%	1.3%	2.2%
9	Gotion	5.5	6.5	17.8%	2.7%	2.1%
10	Sunwoda	3.2	4.6	44.9%	1.6%	1.5%
Others		18.6	18.3	-2.0%	9.2%	6.0%
Total		202.8	304.3	50.1%	100.0%	100.0%

SNE Research

Sources: SNE Research August 2023
https://www.sneresearch.com/en/insight/release_view/150

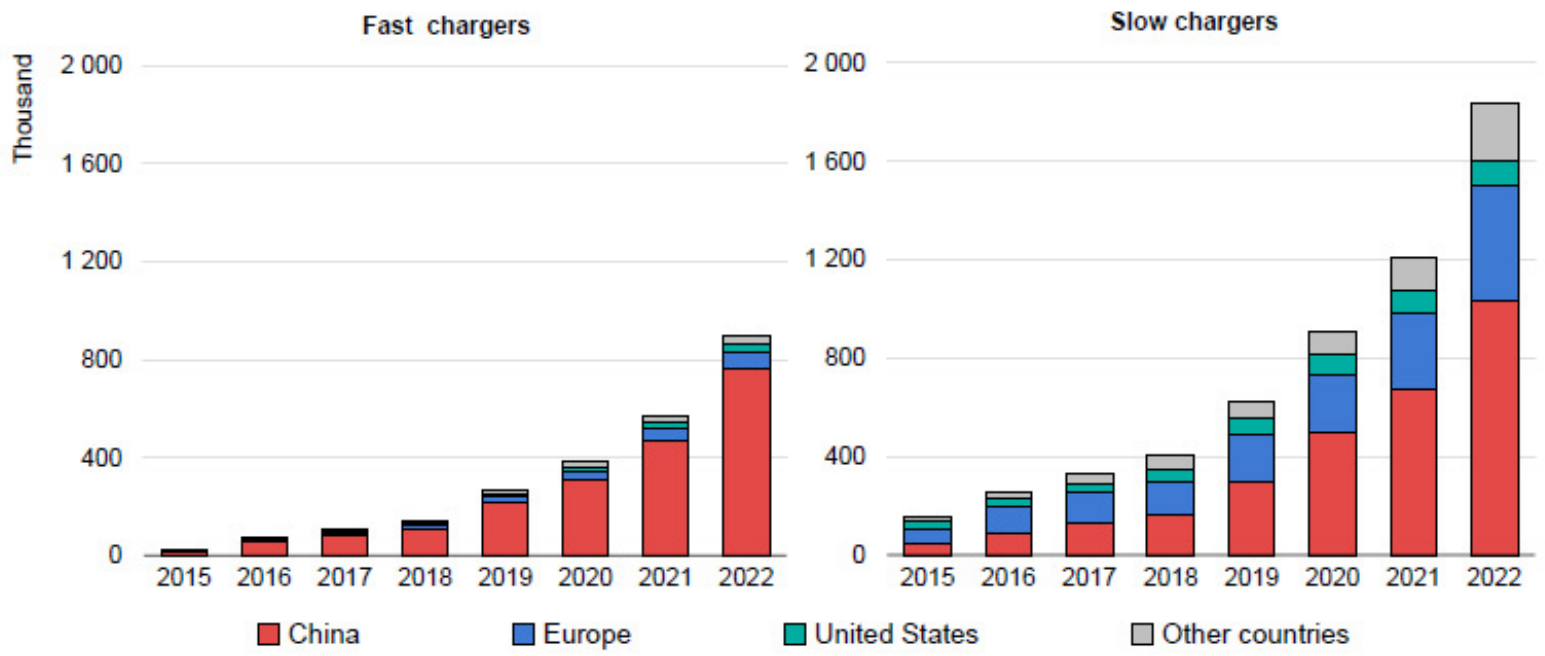
2023 Global EV Battery Market Share



Sources: SNE Research August 2023
https://www.sneresearch.com/en/insight/release_view/150

Installed Public Charging Points 2015-2022

Figure 1.13 Installed publicly accessible light-duty vehicle charging points by power rating and region, 2015-2022



IEA. CC BY 4.0.

Note: Values shown represent number of charging points.
Source: IEA analysis based on country submissions.

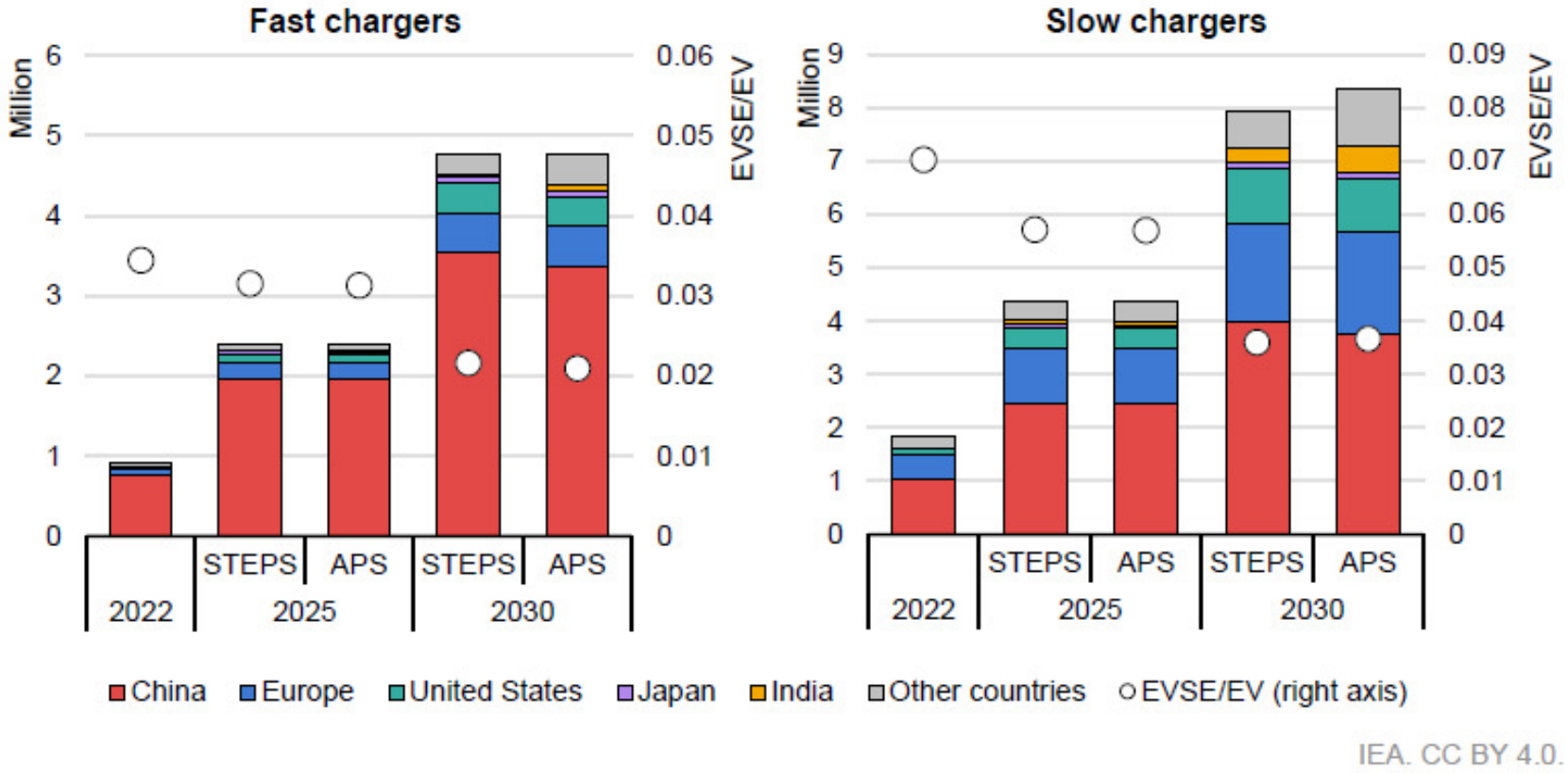
Installed publicly accessible charging points have increased by around 55%, with accelerated deployment led by China and Europe.

The number of fast chargers increased by 330 000 globally in 2022, though again the majority (almost 90%) of the growth came from China. The deployment of fast charging compensates for the lack of access to home chargers in densely populated cities and supports China's goals for rapid EV deployment.

Sources: Global EV Outlook 2023 (IEA April 2023)

Global EV Chargers 1 : Public Chargers

Figure 3.10. Number of public light-duty vehicle chargers installed by region, 2022-2030



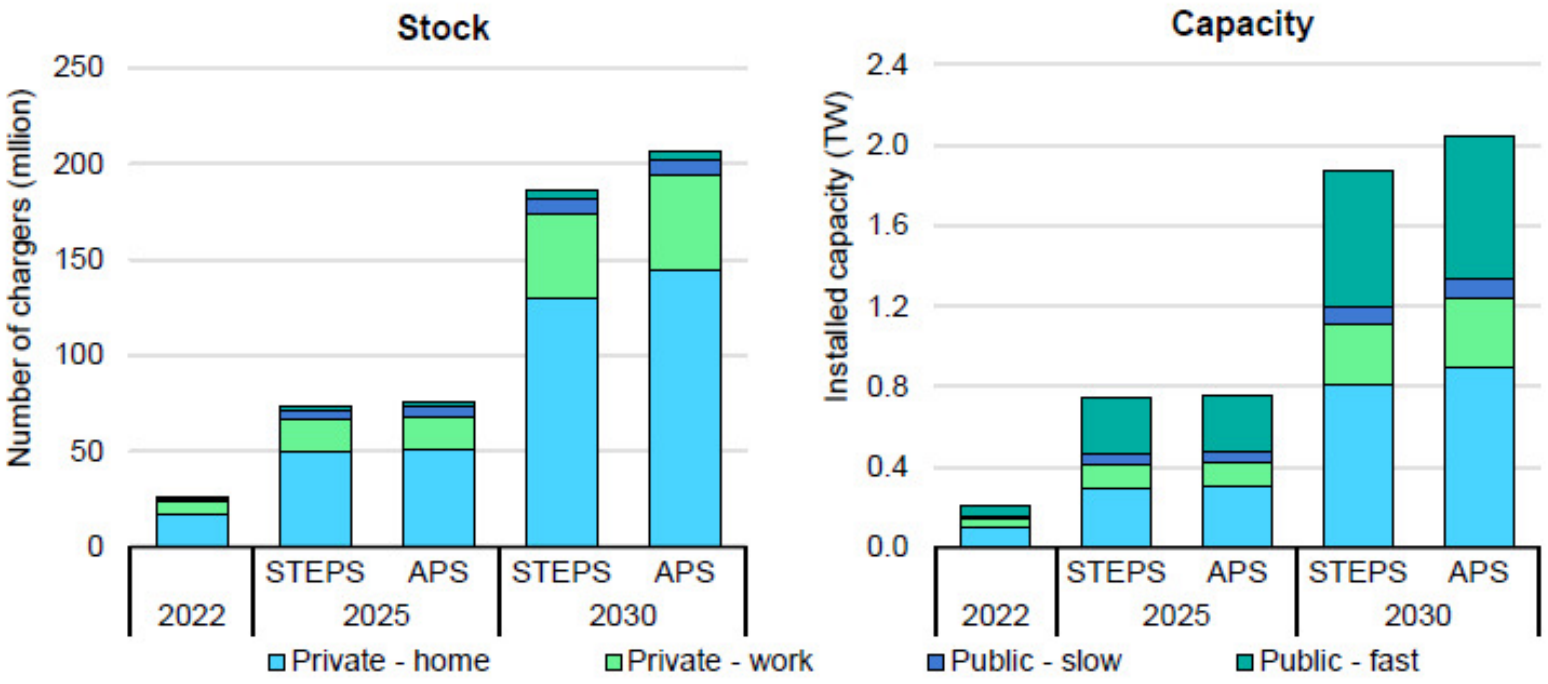
Notes: STEPS = Stated Policies Scenario; APS = Announced Pledges Scenario; EVSE = electric vehicle supply equipment. Regional projected EVSE stock data can be interactively explored via the Global EV Data Explorer.

The number of publicly accessible light-duty vehicle chargers increases from about 3 million in 2022 to around 13 million in 2030 in the Announced Pledges Scenario.

Sources: Global EV Outlook 2023 (IEA April 2023)

Global EV Chargers 2：All Types

Figure 3.8. Light-duty vehicle charger installations by number and capacity, 2022-2030



IEA. CC BY 4.0.

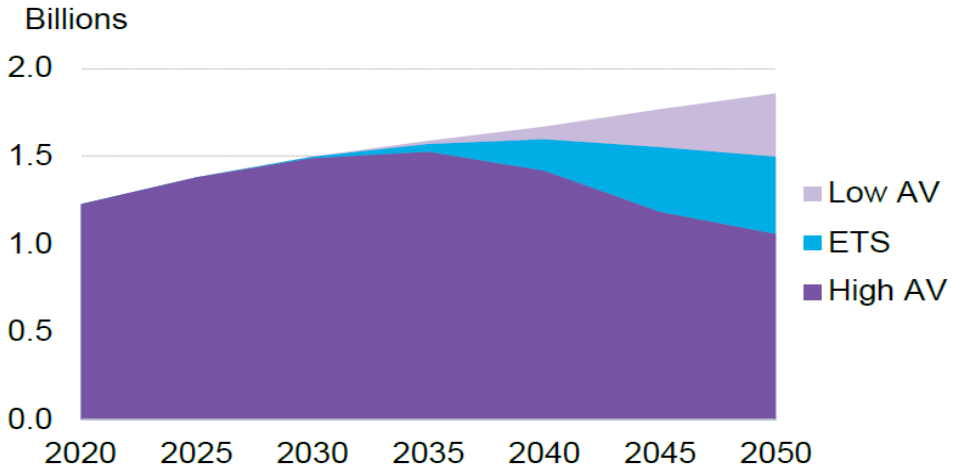
Notes: STEPS = Stated Policies Scenario; APS = Announced Pledges Scenario; LDV = light-duty vehicle. Regional projected electric vehicle supply equipment (EVSE) stock data can be interactively explored via the Global EV Data Explorer.

By 2030, public charging points represent fewer than 10% of charging points for light-duty vehicles, but 40% of charging capacity.

Sources: Global EV Outlook 2023 (IEA April 2023)

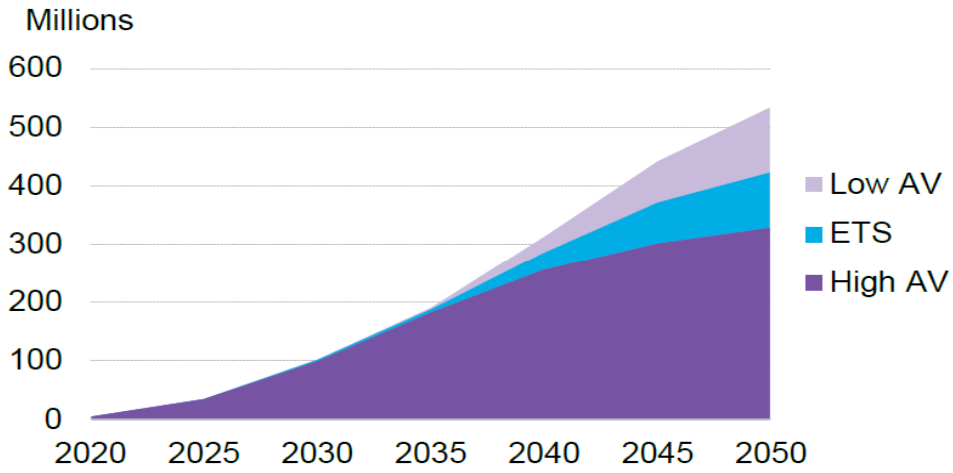
Global EV Chargers 3：High AV Scenario

Figure 15: Global passenger vehicle fleet outlook under varying autonomous vehicle adoption scenarios



Source: BloombergNEF. Note: ETS is BNEF's Economic Transition Scenario. High and Low AV scenarios reflect varying AV adoption.

Figure 16: Outlook for number of charging connectors under varying autonomous vehicle adoption scenarios



Source: BloombergNEF. ETS is BNEF's Economic Transition Scenario. High and Low AV scenarios reflect varying AV adoption.

Depending on the region in which they operate, robotaxis can cover three to five times the annual distance compared to private passenger vehicles, meaning that in a high AV (autonomous vehicle) adoption scenario, fewer vehicles are required to offer the same level of mobility to consumers. The high-AV scenario requires 40% fewer EV chargers than the low-AV scenario by 2050.

Sources: BloombergNEF's 2023 Electric Vehicle Outlook (Bloomberg Finance L.P.2023)

Q & A

Thank You

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