

E A C

■ INTERNATIONAL CONSULTING

STATUS QUO AND FUTURE ROADMAP

CHINA LIB MARKET

3RD VDMA EMINT CHINA MANAGEMENT MEETING 2019

SUZHOU, NOV 28TH 2019

OUR EXPERTISE – 25 YEARS OPERATING EXPERIENCE

EAC International Consulting was one of the first management consultancies to specialize on Asia with strategy development and globalization solutions for mid-cap and multinational companies



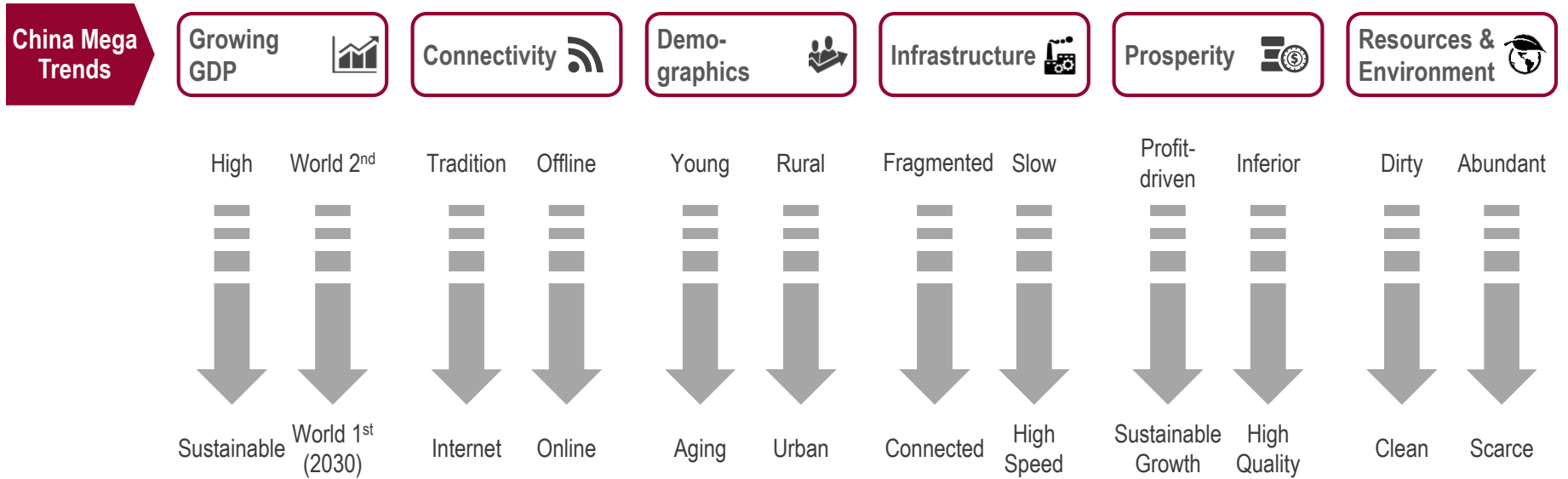


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1 | **CHINA BRIEF**

CHINA BRIEF – MEGATRENDS

China is in an economic transition process with industrial, demographic and environmental changes, as well as a strong trend for urbanization and other lifestyle adaptations



Wealthier China



Digital China



Greener China

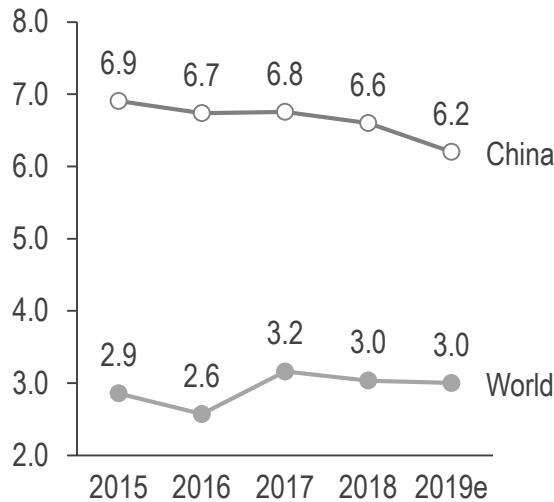


Dynamic China

CHINA BRIEF – SLOWING GDP GROWTH

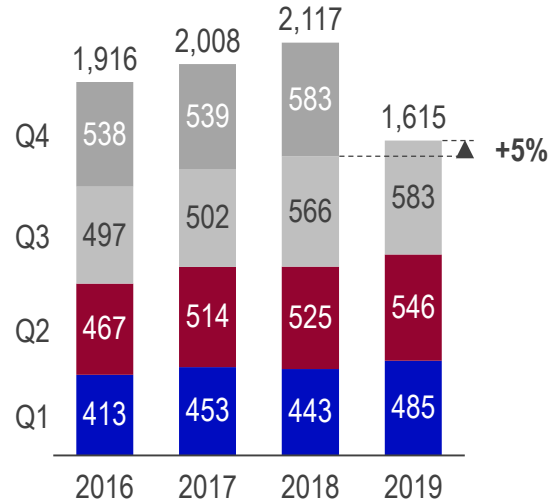
With slowing GDP growth & FDI inflows, Chinese government put high attention to shift to higher value-added manufacturing & to avoid competition from low-cost countries that are less affected by trade war

GDP GROWTH (% YoY)



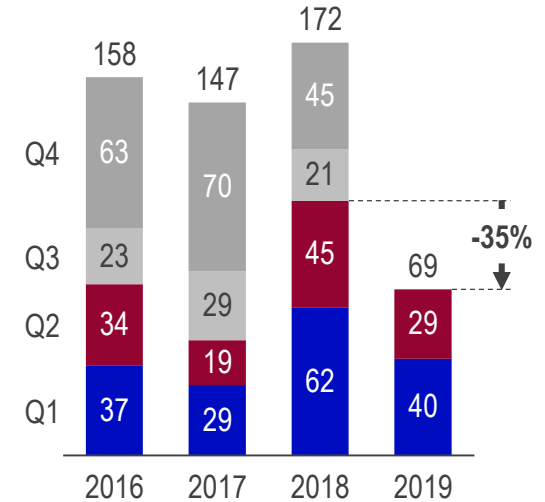
- Economic **growth is slowing down** to more sustainable levels
- China is expected to **reach target growth rate (6 – 6.5%)** in 2019

EXPORT VALUE (BLN EUR)



- Exports are **rising despite the ongoing trade conflict** with the US
- Companies **rushed exports before new tariffs** came into effect in 09/2019

FDI INFLOW VALUE (BLN EUR)



- FDI inflows in Q1 and Q2 of 2019 **dropped compared to 2018**
- Foreign investors are likely **reluctant due to unstable global trade** relations

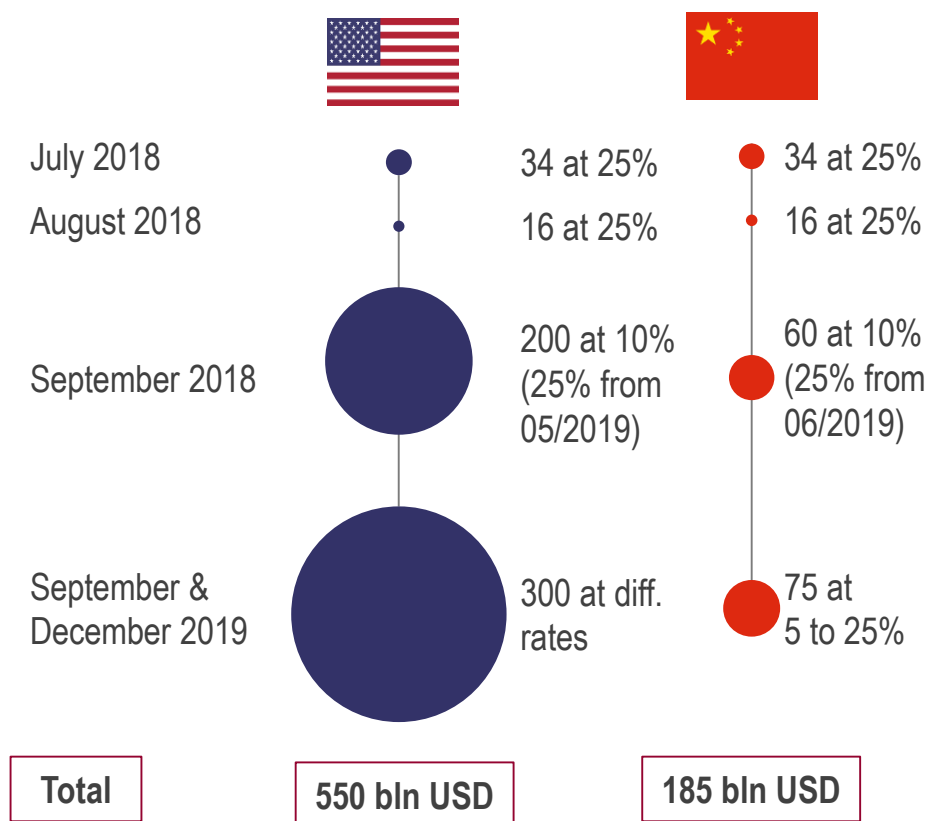
CHINA BRIEF – SINO-US TRADE WAR (1/2)

One main reason for the slow-down in China is the US-China trade war which continues to escalate, US has implemented total of 550 bln USD on Chinese products compared to 185 bln USD implemented by China

STATUS OF US-CHINA TRADE WAR

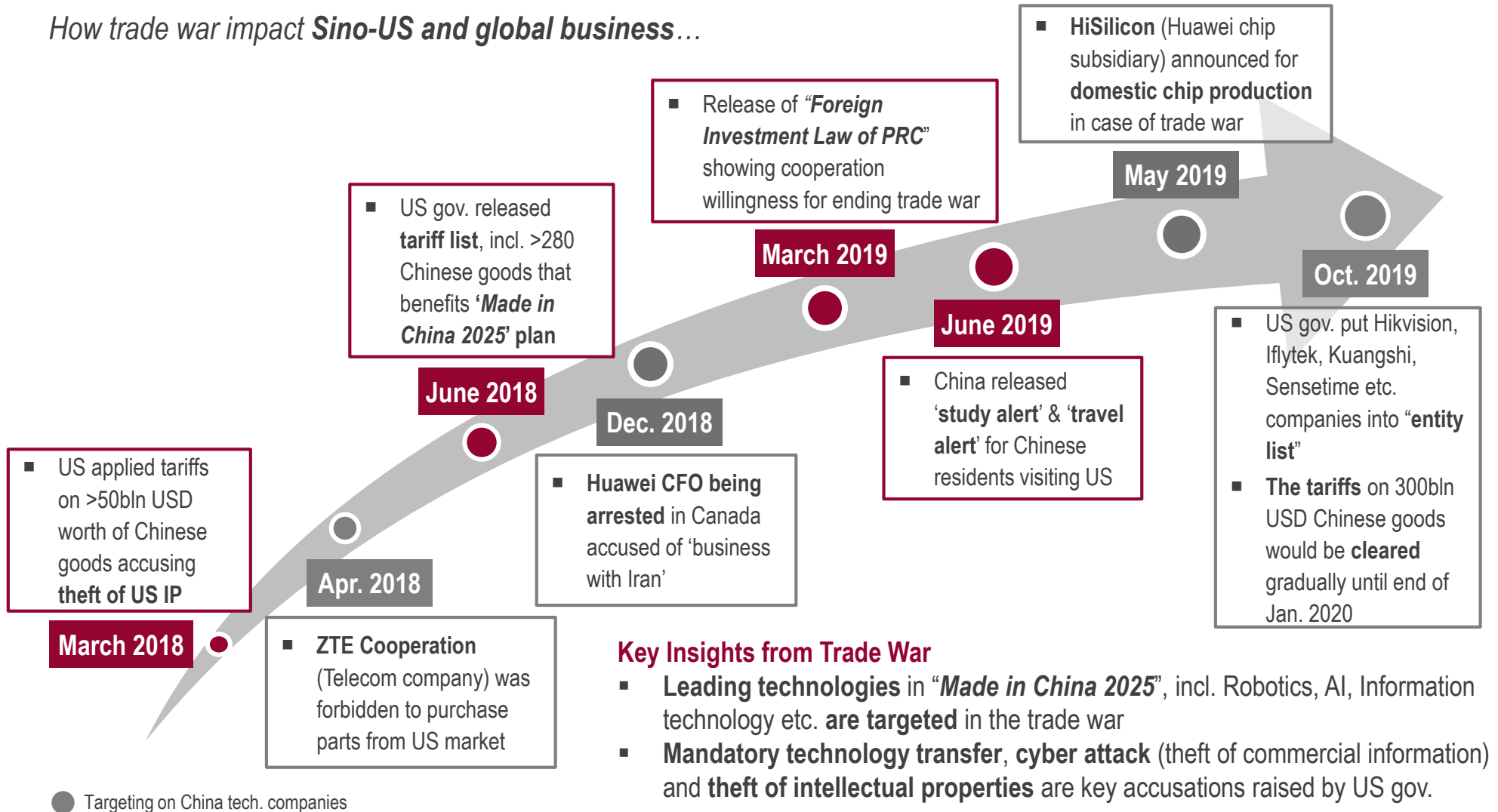
- **US-China trade war has started to escalate**, with both parties significantly increasing tariffs
- **China has imposed tariffs on 185 bln USD** worth of products from the US, while the United States have implemented **tariffs on around 550 bln USD of imports**
- The **cost of the trade war** for a **typical US household** is estimated at **500\$ until the end of 2019**
- **Recent activities:**
 - Early Oct: **13th round of trade talks** planned
 - Sep 13th: China **excludes some agricultural goods** from planned tariffs
 - Sep 11th: US agrees to **delay increasing tariffs** until after the Chinese national holiday
 - Sep 2nd: **China lodges WTO complaint** against US tariffs
 - Sep 1st: **Newest round of tariffs** on both side come into effect as planned

TIMELINE OF TARIFFS (BLN USD)



CHINA BRIEF – SINO-US TRADE WAR (2/2)

How trade war impact **Sino-US and global business...**



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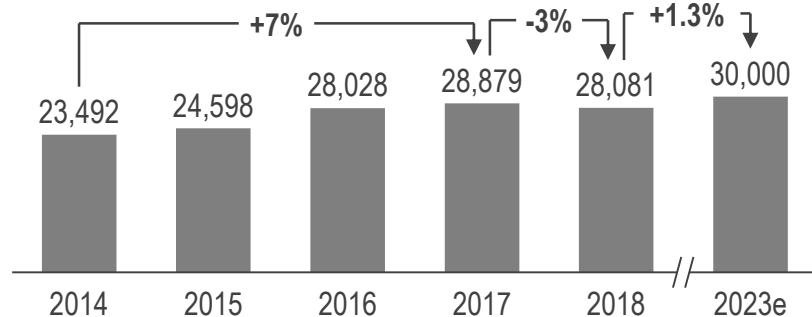
2 | **LIB – KEY UNDERLYING MARKETS**

CHINA AUTOMOTIVE MARKET OVERVIEW (1/2)

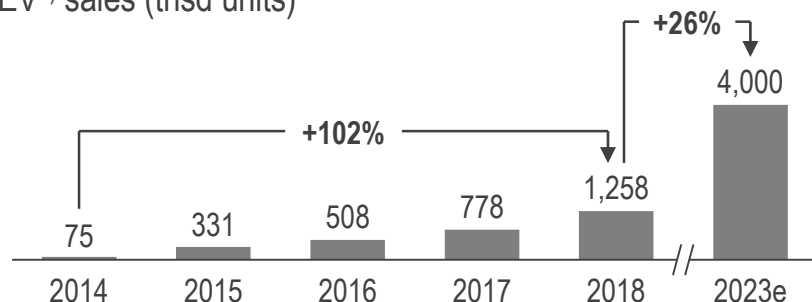
China automotive market has experienced negative growth, while is estimated to gradually recover in the coming years; NEV sales is forecasted to show high growth continuously

CHINA AUTOMOTIVE MARKET OVERVIEW

Automotive sales (thsd units)



NEV¹⁾ sales (thsd units)



MARKET CHARACTERISTICS AND INSIGHTS

- China automotive market has experienced **negative YOY sales growth** of -3% in 2018
- Total market is forecasted to stop falling and **gradually recover** to reach sales of **30 mio** in **2023**
- Meanwhile, NEV achieved sales volume of more than 1 mio in 2018 and is estimated to reach **4 mio** sales in **2023** with a **CAGR of 26%**
- FCV market is still in infancy stage despite the fast growth in the past years; sales volume was 1,527 units (2018)

Key Learnings

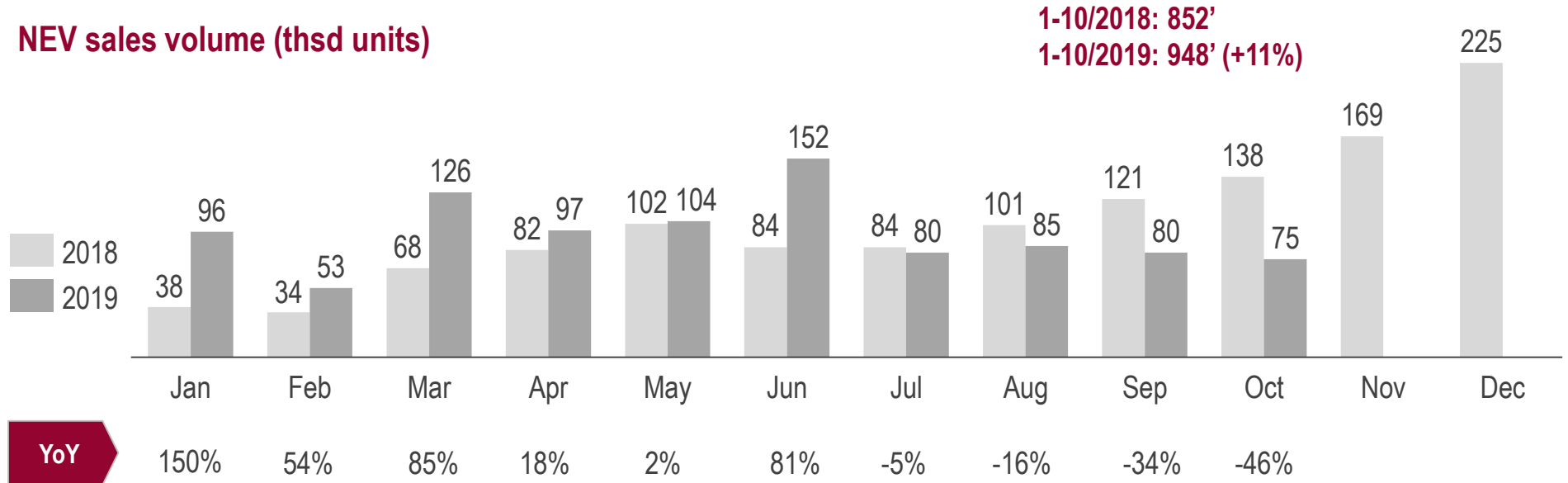
- China automotive market is rapidly **shifting towards E-Mobility**
- ICE vehicle sales are declining**, but still high in volume
- Companies are recommended to **increase investment on NEV drive technology** and keep the leading position in ICE market

1) NEV: new energy vehicle, incl. BEV, PHEV and FCV

CHINA AUTOMOTIVE MARKET OVERVIEW (2/2)

China NEV sales volume has experienced negative growth since July 2019 due to massive subsidy cuts and might lead to slow-down of dynamic past growth rates until end the 2019

NEV sales volume (thsd units)



- China **NEV sales volume** has **experienced negative growth** since July 2019 due to the significant impact of **sharply reduced NEV subsidies** from July onwards
 - Ahead of July cuts, partial demand was pulled into June which showed >80% yoy growth
 - BEVs with an e-range below 250 kw will not enjoy subsidies anymore thus mini and subcompact BEVs are the most affected

CHINA POWER INDUSTRY OVERVIEW

China is expected to increase investment in renewable energy, incl. solar, wind and biomass, while coal power will grow under-proportionally with <3% p.a. due to resource and environmental restrictions

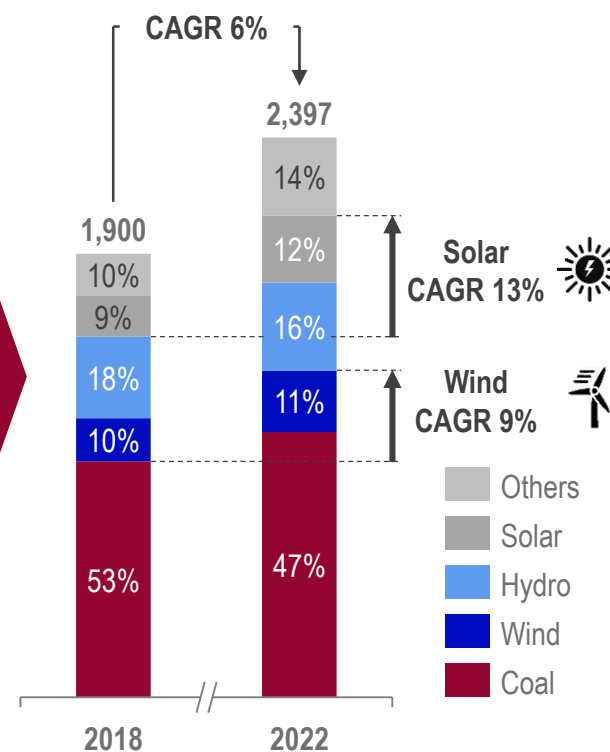
OVERVIEW ENVIRONMENT & RESOURCES CHINA

- China is **world largest emitter of CO₂**, responsible for **27% of global emissions**:



- As part of the Paris agreement, China has pledged to **improve by 2030**, e.g.:
 - **Peak carbon dioxide emissions** latest by 2030
 - **Lower carbon dioxide emissions** per unit of GDP by 65% from the 2005 level
 - **Increase the share of non-fossil** in the energy mix to around 20%
- China **increases investment in renewable energy**, especially **solar and wind** will be significantly increased until 2022
- Coal power capacity is expected to slowly grow **at <3% p.a. until 2022**
- Government also rolled out 3-year plan (2018-2020) to ensure solid achievements in **controlling air pollution**, incl. reducing SOx and NOx by >15% compared to 2015

INSTALLED POWER CAPACITY (GW)



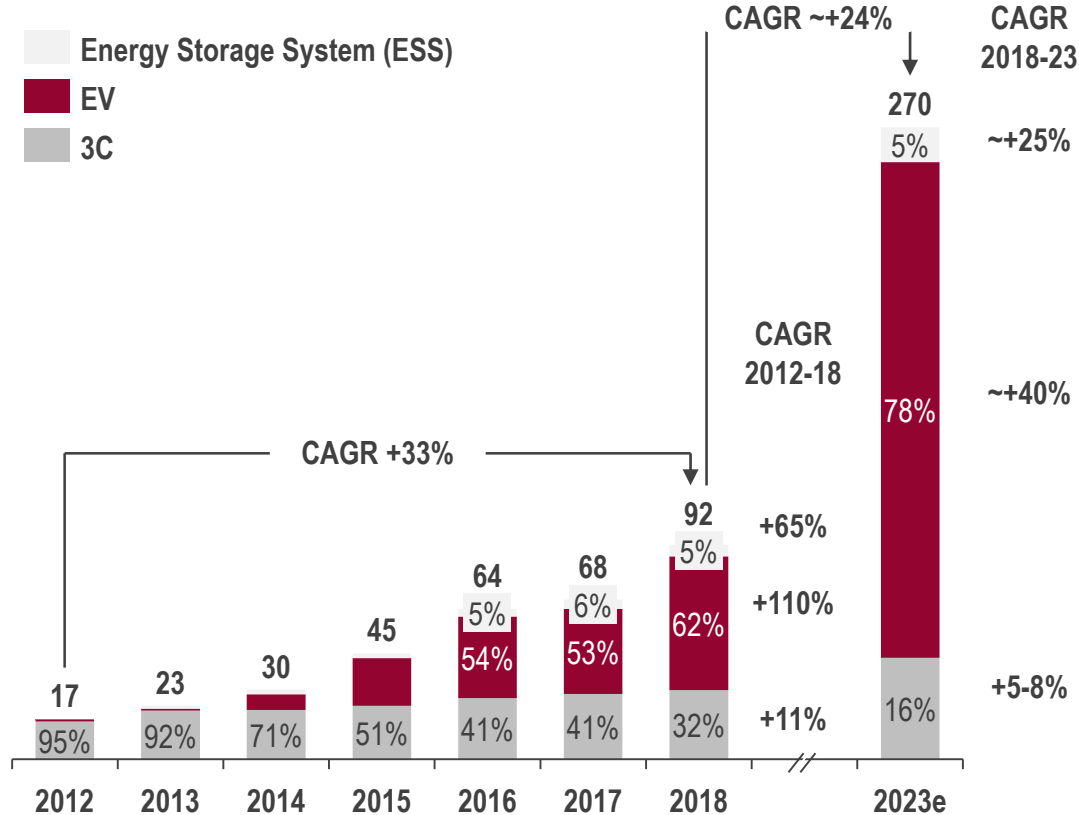
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3 | LIB – MARKET AND OUTLOOK

CHINA LITHIUM-ION BATTERY MARKET OVERVIEW

LIB market grew significantly from between 2012 and 2018 with a CAGR of +33% driven by 3C and EV, while further growth is expected at CAGR ~+24% until 2023 driven by EV and ESS

LITHIUM-ION BATTERY SALES CHINA 2012-2023 (GWh)













INDUSTRY CHARACTERISTICS

- China LIB market
 - 1st peak appeared in 2011-14, driven by rise of mobile phone and electronics industry
 - 2nd peak appeared in 2015-18, driven by strong growth in EV application
- Future growth is driven by EV and ESS
 - 3C battery tends to be saturated
 - EV battery demand will increase continuously
 - ESS battery is expected to continuously grow, but highly fragmented





















CHINA EV BATTERY – LEADING PLAYERS

EV battery manufacturing is still a “*Chinese game*” with low presence of international players. Besides BYD and CATL are dominant players with massive expansion plans

RANK	COMPANY	HQ	PRODUCTION SITES	DOMESTIC SALES VOLUME (GWH)			2018 CAPACITY (GWH)	EXPANSION PLAN
				2018	2017	GROWTH		
1	 CATL	Fujian	Jiangsu, Fujian, Qinghai	23.5	10.6	+122%	31	+86 GWh in Ningde, Liyang, Guangzhou, Germany, SOP 2022
2	 BYD Battery	Guangdong	Guangdong, Qinghai	11.4	5.7	+100%	28	+72 GWh in Chongqing, Xining, Xi'an, SOP 2023
3	 Guoxuan	Anhui	Anhui, Jiangsu, Shandong	3.1	2.4	+29%	14	+12 GWh in Nanjing, SOP 2021
4	 Lishen	Tianjin	Tianjin	2.1	1.1	+91%	15	-
5	 Farasis	Jiangxi	Jiangxi, Beijing	1.9	1.0	+90%	13	+24 GWh in Zhengjiang, SOP 2022
6	 BAK	Guangdong	Guangdong, Henan	1.7	1.6	+12%	12	+7 GWh in Zhengzhou, SOP 2021
7	 EVE	Guangdong	Guangdong, Hubei	1.3	0.8	+62%	9	+2 GWh in Jinmen, SOP 2020
8	 National Battery Tech	Beijing	Anhui, Jiangsu, Shandong, Hebei	0.8	0.7	+11%	13	+2.5 GWh in Xiangyang, Chuzhou, SOP 2020
9	 CALB	Henan	Henan, Jiangsu	0.7	0.5	+41%	5	+8 GWh in Jintan, SOP 2021
10	 Carene	Shanghai	Shanghai, Jiangxi, Guangxi, Suzhou	0.6	0.25	+161%	6	+64 GWh in Nanjing, Anhui, Shanxi
TOTAL SALES TOP 10 MANUFACTURERS 2018 (GWH)				47 GWh (Top 10 account for 83%)				

GLOBAL BATTERY ESS – LEADING PLAYERS

Similar to EV battery, Asia players have dominated battery energy storage market

	COMPANY	COUNTRY OF ORIGIN	KEY CUSTOMERS	ESTABLISHMENT	CATHODE MATERIALS
1	 LG Chem		ABB, SMA	1947	NCM
2	 Samsung SDI		ABB, S&C Electric	1970	NCM
3	 Narada		Upside	1994	LFP, Lead carbon
4	 BYD		BYD	1995	NCM, LFP
5	 Panasonic		Tesla Energy	1918	NCM
6	 CATL		PowinEnergy	2011	NCM
7	 ZTT		ZTT	1978	NCM
8	 Etrustpower		Etrustpower	2016	NCM, LFP
9	 Shuangdeng		Shuangdeng	2002	Lead acid, LFP
10	 AVIC		Hyper Strong	2007	NCM, LFP



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4 | **SUMMARY**

SUMMARY

- **China's economic growth is slowing down to more sustainable levels**, with industrial, demographic and environmental changes

- **End markets of LIB are in an industry transition process**
 - China automotive market has experienced negative growth, while NEV sales is forecasted to grow significantly
 - Investment in renewable energy, esp. solar will continue to increase driven by supportive government policy, reduced PV cost and emerging markets potential

- **China LIB market is growing heavily**, with huge **untapped potential in ESS sector**
 - EV battery market has ramped up with notable achievement and it is estimated to continue growing at high rate
 - Battery ESS market shows significant potential, and is strongly supported by government policy, declining LIB cost and growing of VRE (e.g. PV) generation

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