

**April 2022**

**New Energy Vehicle**

# **China's Auto Makers are Revolutionizing Automotive Manufacturing**

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Zhen Zhang

Email: [zzhang@hzinsights.com](mailto:zzhang@hzinsights.com)

Tel: 021-61645319

Yunpeng Yang

Email: [ypyang@hzinsights.com](mailto:ypyang@hzinsights.com)

Tel: 021-61645319

## Automotive Die Casting Manufacturing Investment Thesis

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- **Although the new integrated one piece die casting technology** using new heat-free alloy casting materials **is still in its early stages of application and development, it is expected to become mainstream** in the coming years. As such, domestic enterprises such as **L.K. Technology (0558.HK), Lizhong (300428.SZ), and Wencan (603348.SH)**, which already possess this important technological barrier to entry **are set to benefit** in the near term.
- **The new integrated one piece die-casting technology significantly reduces the manufacturing cost** of car production. Therefore, domestic automakers are adopting the new integrated die-casting technology as the range of auto body parts that can be integrated into one super large piece have expanded.
- **In 2020, Tesla die-casted the rear chassis (base frame) of its Model Y, integrating more than 70 parts into one single large piece heat-free die-casting auto body part, and thereby reducing 40-50% of the manufacturing cost.**
- Besides the rear base chassis, the rest of car body, including the front cabin frame, battery tray, the rest of body frame, and the various 370 small components & parts, can also be integrated and produced via the new technology in the near future. **The ultimate goal is to manufacture the entire vehicle using just 3-4 ultra-large structural body parts via the new integrated die-casting technology.**
- **Domestic automakers** are still developing the new technology, and the new die-casting technology of rear chassis structure is basically mature. A new significant force in the domestic automobile manufacturing industry such as NIO, Xpeng, and Li Auto **will be launching new cars manufactured with this technology in the second half of 2022.**
- Demand for **lightweight body frame** manufactured with the newest heat-free integrated die-casting technology has **stimulated explosive demand for ultra-large die-casting machines.** Between 2015-2020, China's die-casting machine production grew at an annualized rate of about 20%. As the die-casting machine market growth accelerates after 2020, the sector is expected to reach an annualized average **growth rate of greater than 50% from 2022 to 2025.**

## Automotive Die Casting Manufacturing Investment Thesis

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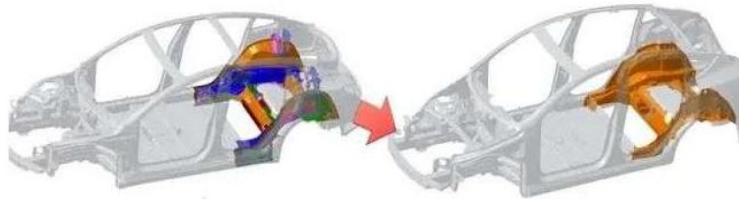
- **L.K. Technology (0558.HK) occupies more than 80% of the market for domestic ultra-large die-casting machines due to its technological first-mover advantage.** Its competitors include Buhler, Yizumi, and Haitian Metal.
- The new heat-free casting material has been a major technological barrier to overcome for domestic automakers. **Lizhong Group and others have finally developed heat treatment-free alloy casting materials to break the overseas monopoly.** Tesla first used the new heat-free integrated large die-casting manufacturing process in its Model Y with imported new heat-free alloy casting materials. The new die-casting projects of Lizhong, Wencan and NIO used independently and domestically developed heat-free alloy material, which breaks the overseas monopoly on the new die casting material.
- With traditional die-casting manufacturing technology, traditional die-casted frames and body parts will not meet the strength, durability, and impact resistance requirements of vehicles without heat treatment. However, with heat treatment, it is easy to have deforms and surface defects. **The new heat-free manufacturing technology overcome these problems.**
- **Die-casting factories integrate: 1) substantial equipment investment capital, 2) mold manufacturing know-how, 3) new heat free die-casting technology, and 4) upstream and downstream industry logistics,** as its various core barriers to entry. Upstream of die-casting factories are die-casting machine manufacturers and material suppliers. Downstream are the auto parts suppliers and automakers. Traditionally, as an intermediate link, **die casting factories' large sum of equipment investment capital and mold manufacturing technology are its two main entry barriers.**
- **All in all, the new innovations in die casting technology and manufacturing process are expected to: 1) improve car production efficiency, 2) lower car manufacturing cost, 3) lower carbon emissions during production, 4) shorten production cycle, 5) simplify complex manufacturing process, 6) reduce deformations and surface defects, 7) reduce a car's body weight, and 8) reduce energy consumption and improve cars' milage range.**



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## New heat-treatment-free integrated one piece die- casting technology

# Tesla's new integrated die-casting technology simplifies complicated manufacturing process, shortens production cycle, and reduces manufacturing costs by at least 20%



**Tesla's Model Y boasts a product qualification rate of 75-80% and cost reduction of 20-30%**

Tesla	Cost reduction factors
Production	Production time of 2 hours for the base plate after conventional stamping and welding, and 2 minutes for one-piece die-casting
Production Line Investment	Traditional welding line requires more than 300 welding robots, integration technology reduces it by 1/3
Material Changes	Tesla die casting weighs 60-65Kg, about 5% less than the traditional

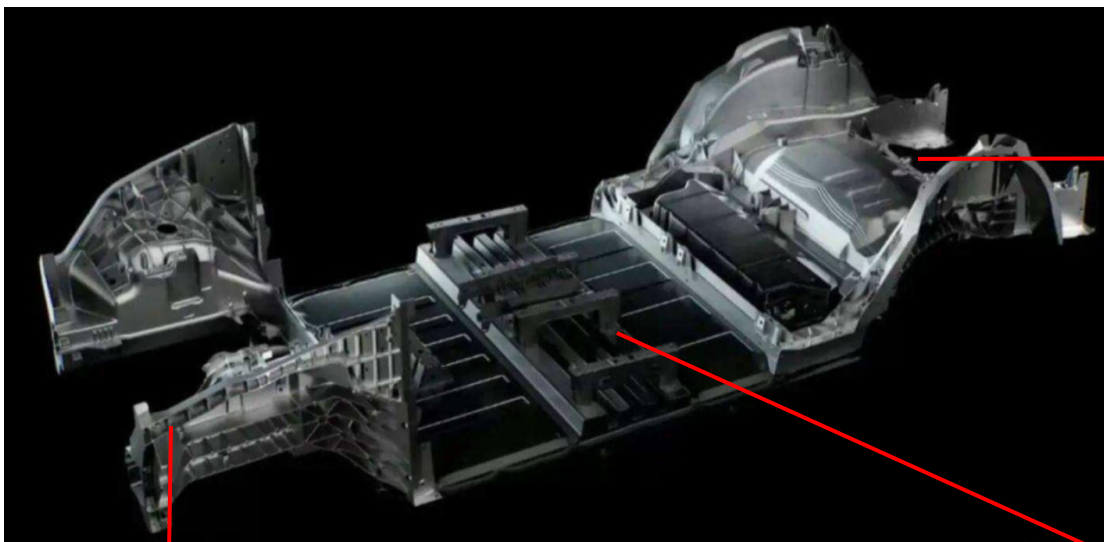
- **Tesla uses integrated die-casting technology to integrate more than 70 parts of the rear chassis into one piece production:** The traditional die-casting process is mainly used in the automotive industry for the production of spare parts such as engine blocks and transmission boxes. In 2020, Tesla uses innovative technology in its Model Y production. 79 parts of the rear chassis of Model Y were integrated and pressed into 1 to 2 large frame-structure. The North American plant has two 4,000-ton die-casting machines to integrate and press components into the left and the right parts and then binding the two large parts by welding them in the middle. The Shanghai plant uses one 6,000-ton die-casting machine to integrate and press them into one major piece of structure.
- **Tesla's integrated die-casting manufacturing process reduces costs by at least 20%:** Integrated die-casting effectively reduce the production cost of the body-frame by reducing production time, decreasing production line investment and lower material costs. According to the official data published, cost reduction was about 40-50%. The actual cost reduction was around 20-30% at volume production. In addition, the use of aluminum alloy materials reduces the weight of the body. Tesla Y-Model's weight reduction was about 5-10%. The less weight will add to an electric car's mileage.

## In 2021, integrated one piece die-casting manufacturing of body frame structures began to accelerate due to the maturity of the technology

Domestic brands of die casting machine clamping force upgrades			Development of domestic heat treatment-free materials	
Equipment	Previous clamping force	Current maximum clamping force	Company	Heat-free material situation
L.K. Technology	6000 tons	12,000 tons	Lizhong Group	In 2020, Lizhong Group obtained the national invention patent certificate. The elongation rate is more than 5 times higher than the traditional die-casting material, and the price can be 15-20% less than similar foreign materials.
Izumi	3500 tons	7000 tons	Guangdong Hongjin	Established in March 2009, a wholly owned subsidiary of Huajin Aluminum
Haitian Metal	4000 tons	8800 tons		

- The maturity of integrated die-casting technology is the reason for its current accelerated application:** Starting in 2021, domestic automakers began to develop integrated die-casting technology, with cost reduction being the core driver. But the maturity of die-casting process is the reason for its acceleration. Major market growth factors include: 1) die-casting machine clamping force continues to achieve breakthroughs, 2) availability of free of heat treatment materials to achieve localization, breaking the industry monopoly, and 3) the breakthroughs integrated die casting-mold manufacturing capability.
- A new force of companies in the domestic automobile manufacturing industry will soon deliver integrated die-casting manufactured cars to the market.** The traditional automakerst are lagging behind. New automakers such as Xpeng, NIO, Li Auto, high cooperation, are already working with contracted integrated die-casting factories and are expected to have new car models launched in the second half of 2022. Traditional automakers such as BYD, Geely and FAW, are lagging behind. Traditional automakers are currently trying to catch up by investing in related R & D and performing laboratory testings, with mass production expected to be achieved within 3 years.

## Integrated one piece die casting technology of rear chassis is mature



Integrated one piece die casting technology of the rear chassis by Tesla, Xpeng, NIO, and Li Auto is mature. It uses a 6000 tons of die-casting machine. BYD, FAW, and others are lagging behind in related development.

The battery tray component is currently using a smaller tonnage die-casting machine that is divided into six separate die-casting parts. In the future, the subsequent use of integrated one piece die-casting production will require a 12,000 tons die casting machine.

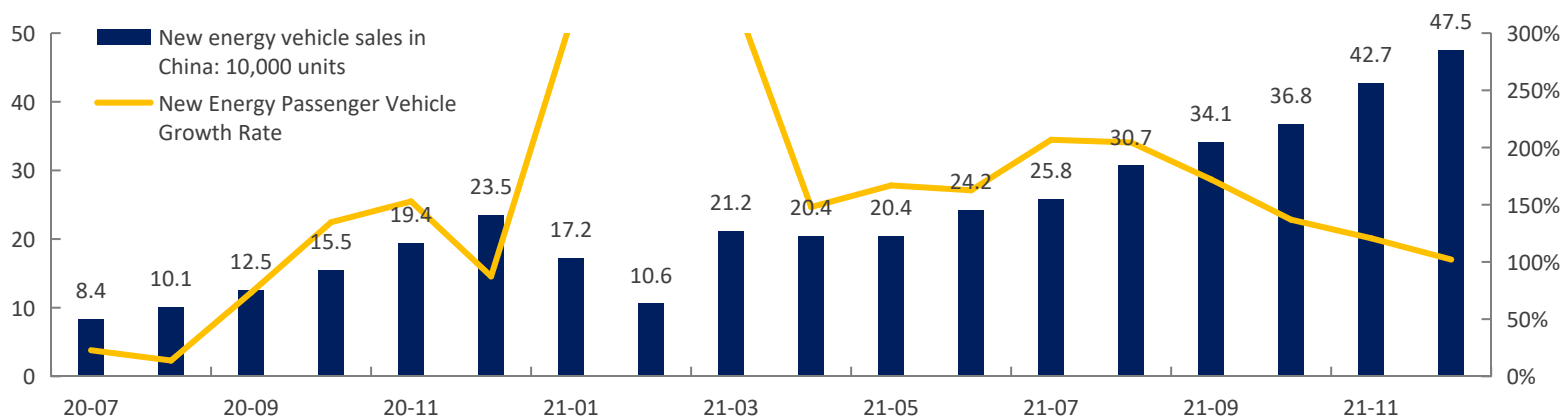
The front hatch requires a die-casting machine tonnage consistent with the rear chassis at 6,000 tons or more, and the technology is still in the developing and testing stage. Tesla is currently conducting relevant product prototypes in its Texas, U.S. factory as well as in its Berlin, Germany factory.

**The final objective of integrated one-piece die-casting manufacturing process is to integrate the more than 370 auto parts into 3-4 structural body parts:** rear base-floor frame (rear chassis), front cabin frame, rest of body frame, and battery tray.

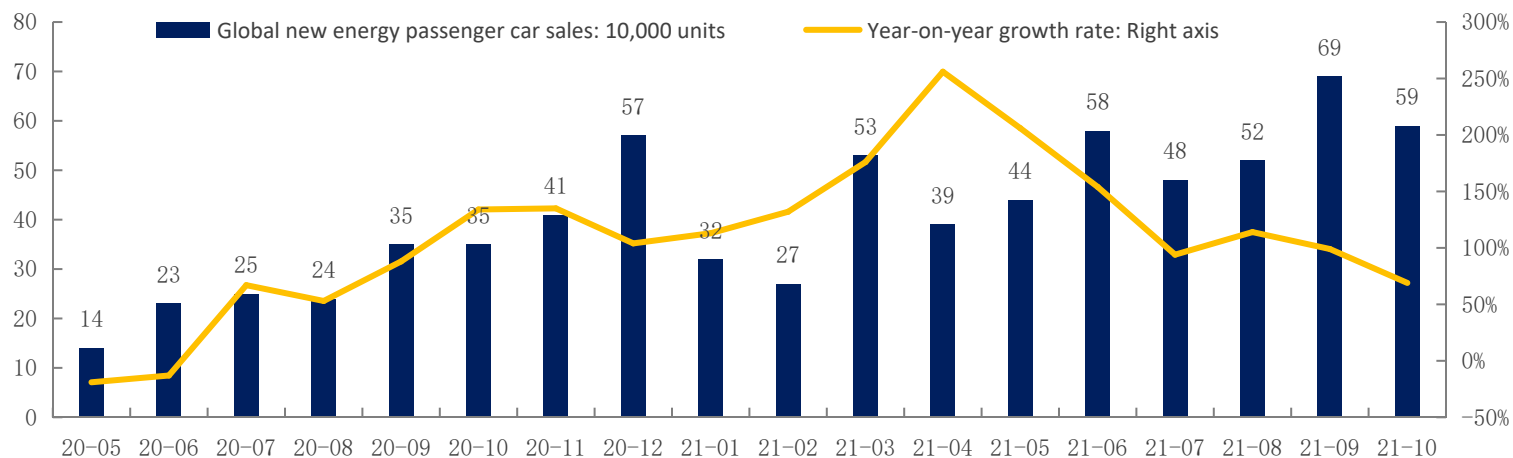
At present, the rear chassis die-casting technology is relatively mature, the front cabin frame die-casting is in the developing and testing stage. The rest of body frame and battery tray are being considered for further R & D by domestic die-casting manufacturer such as Guangdong Hongtu Technology.

# Growing sales of new energy vehicles further facilitate the development of lightweight NEVs and the new integrated die-casting technology

## New Energy Vehicle Sales and Growth Rate in China



## Global new energy passenger vehicle sales and its growth rate







02

## Explosive market demand for ultra large die casting machines

# Industry Overview: upstream for integrated die casting manufacturing are the die casting machines, material suppliers, and mold factories

## Integrated die-casting industry chain overview

Manufacturing	Die Casting Machine	Material suppliers	Mold Factory	Die Casting Plant	Automakers
Main Functions	Design and production of super-large die-casting machines	Development and supply of heat treatment-free aluminum alloy materials	Over 6000 tons super large mold production	Production of corresponding structural parts by die-casting machine	Body structure assembly
Representative Companies	Domestic: L.K. Technology, Haitian Metal, Yizumi; Japanese: Toshiba, Toyo, Ube; European: Buhler, Fulai, Iterperez	Shanghai Jiaotong University, Lizhong Group, Guangdong Hongjin	Ningbo Zhenzhi, Ningbo Sciveda, Guangzhou Xingqiang, Ningbo Heili Technology, Dalian Dongli Machinery, FAW Casting.	Wencan, Guangdong Hongtu, IKD, Tuopu Group, Quanfeng Auto, Millison, Xusheng	Tesla, NIO, Xpeng, Li Auto, HiPhi, Volvo. BYD, Geely, FAW
Industry Barriers	Die-casting machine production, manufacturing level	Material patents, material properties	Ultra-large mold practicality	Differences in die-casting technology, qualified rate of structural parts	Cost reduction margin, downstream consumer acceptance

Data source: Horizon Insights Research

# Explosive market demand for ultra large die casting machines resulting in sales order backlogs and delayed shipments

## Domestic super-large die-casting machine order situation

Company	Equipment volume	Machine Source
Tuopu Group	6 sets of 7200 tons, 10 sets of 4500 tons, 5 sets of 2000 tons	L.K. Technology
IKD	Total 45 units, 35 units above 1000 tons, 4 units of 4400 tons, 2 units of 6100 tons, 2 units of 8400 tons	Bühler
Wencan Co.	2 sets of 6000 tons, 3 sets of 4500 tons, 1 set of 3500 tons, 1 set of 2800 tons	L.K. Technology
Guangdong Hongtu	1 unit 6,800 tons, 2 units 12,000 tons	L.K. Technology
Xusheng	1 x 4400 tons	L.K. Technology
CHERVON Auto	2 sets of 2,700 tons, 3,000 tons, 4,200 tons, 4,400 tons, 6,000 tons and 8,000 tons each	L.K. Technology
Tesla	Shanghai plant 3 units of 6000 tons, North America plans to purchase 8000 tons	L.K. Technology
Volvo	Swedish plant introduces more than 8,000 tons	Bühler/L.K. Tech
Millison	4 units of 8,800 tons, 1 unit installed for testing	Haitian Metal

# Estimated price overview for die casting machine, mold machine, and new heat-treatment-free aluminum alloy material

## Estimated prices of each brand of die-casting machine (in yuan)

Clamping force	L.K. Technology	Yizumi	Haitian Metal	Bühler
1000 tons	Around 5 million	Around 5 million	Around 5 million	Around 7 million
3000 tons	Around 18 million	Around 18 million	Around 18 million	Around 25 million
6000 tons	Around 40 million	--	--	Around 60 million

## Mold price and material price

Category	Price
6000 tons mold	The price of a single set of molds is around 10 million yuan
Heat treatment free aluminum alloy	15-20% higher price than traditional aluminum alloy

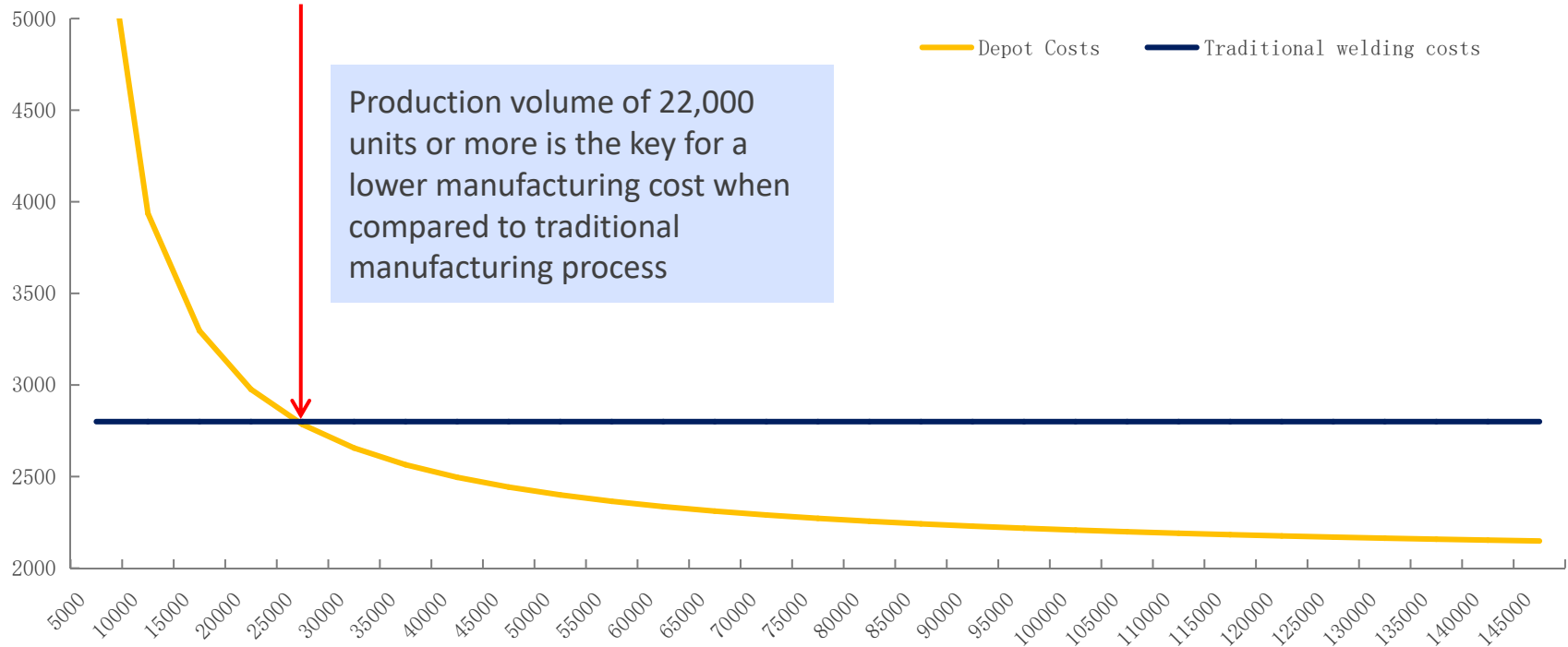
For automakers, the decision to use integrated die-casting technology is based on production cost.

For models with high production volume, the product qualification rate and the durability of the mold-casting machines are two major factors in cost reduction.

For models with small production volume, if the integrated die-casting process is used, it is difficult to cover the mold-casting related manufacturing costs, and make a profit .

# Cost reduction curve: Integrated die-casting has the advantage of cost reduction only if the production volume of a single model exceeds 22,000 units

## Cost comparison between integrated die casting and conventional welding



Based on mold cost, die-casting machine cost, aluminum alloy cost, and die-casting manufacturing cost, it is concluded that only when the total sales of a single model reaches 22,000 units, will there be a manufacturing benefit associated with the new integrated large die casting manufacturing process as compared with the tradition manufacturing process. In addition, the higher the sales of that model, the greater the reduction in costs, with an eventual cost reduction approaching 30%.

# Huge market potential: ultra large die-casting machine market may undergo phenomenal growth in the next 5 years

From 2018 to 2021, of the 103 domestic car models, 74 had reached sales of at least 22,000 units per model, representing 71.8% of all domestic car models on the market, and accounting for 87% of total sales.

## Market forecast for the next 5 years

Estimated total sales volume of passenger cars	Integrated new tech models	Integrated new tech penetration rate estimation	Structural parts for integrated new tech	Number of new integrated die-casting vehicles	Demand for new die-casting machines
25 million	21.75 million	30%	Rear soleplate and front hatch frame	6.52 million	About 250 units
25 million	21.75 million	50%	Rear soleplate and front hatch frame	10.87 million	About 400 units
25 million	21.75 million	70%	Rear soleplate and front hatch frame	15.22 million	About 550 units

Of the sales order backlog for 6000 tons of ultra-large die-casting machines, only about 10 units have been delivered, with about 30 units still under overtime work in progress. It is expected that the market for ultra large die casting machines will undergo explosive growth next 5 years.

Given that a single structural part for a 6000 tons die-casting machine is priced at around 40 million yuan, potential market value for a two structural parts die-casting machine market is estimated to be around 10-21 billion yuan, while potential market value for a four structural parts die-casting machine market is estimated to be circa 34-60 billion yuan.

The total market value for all die-casting machines is currently around 18 billion yuan, with the market expected to double in the near future.

# L.K. Tech's super large die casting machine has proven track records in domestic market as it is the supplier of Tesla's 6000 tons machine used for Model Y

Machine Category	L.K. Technology	Yizumi	Haitian Metal	Bühler
Machine Features	Within the three plate, dynamic plate, static plate, and back plate segments, L.K. Tech's super large tonnage models are market proven products			Two-plate machine & small and medium tonnage are reliable
	Adopting Siemens' hydraulic system		Bosch hydraulic system, better die casting curve	
	Developing 12,000 tons	Developing of 7000 tons	Delivery of 8,800 tons	8400, 9200 tons

From the technical and market point of view, the core advantages of L.K. Technology's machines and **the reasons that L.K. Technology became the first choice** among all the domestic die casting factories include:

- L.K. Technology has delivered 2500 tons of large die-casting machine to American General since 2010, and has a history of proven experience** in large die-casting machine production and well-trained and experienced technicians.
- L.K. Technology supplied Tesla's 6000 tons machine for Model Y rear chassis manufacturing.** At present, Model Y is in mass production. The Model Y has been successfully launched in the marketplace. LK's machine has been verified by the market. It is more reliable, while the overseas two-plate machines do not yet have a proven track record for its oversized models, and the market is concerned about its stability.
- L.K. Technology is the only company that is currently developing products above 10,000 tons,** and is likely to deliver finished products this year. The price of domestic products is more than 30% lower than overseas products, and the subsequent maintenance of the machine is more convenient in the domestic market, and as such, L.K. Technology has become the first choice.

# L.K. Technology occupies more than 80% of the market for domestic ultra-large die-casting machines due to its technological first mover's advantage

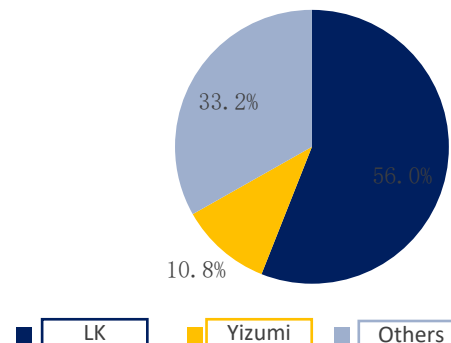
L.K.  
Tech

Three main businesses: die-casting machine, injection molding machine, CNC data center

Eight production bases with monthly production capacity of 2-3 super large die-casting machines

There are capacity expansion plans in mid-2022, with an expected monthly production of 4-5 units.

Domestic die-casting machine market share



L.K. Technology, as the No.1 leading company in the domestic die-casting machine market, has a market share of nearly 60%, and the share of super-large die-casting machines is over 80%.

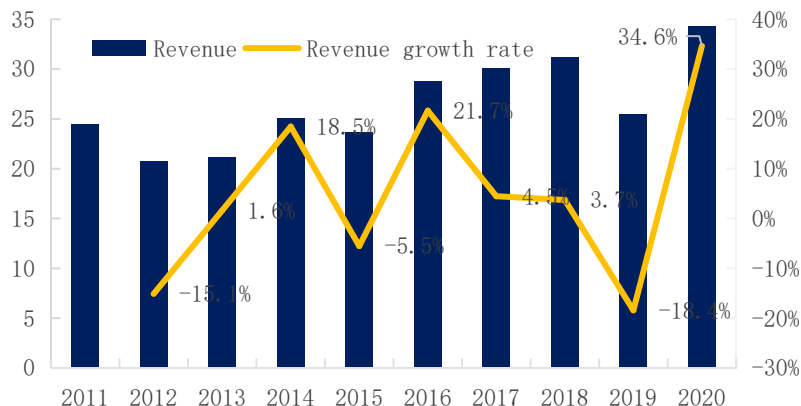
L.K. Technology mass production of 9000 tons die casting machine, design and development of 12000 tons die casting, the maximum clamping force is far ahead of other die casting machine manufacturing companies.

At present, L.K. Technology's 8 bases have separate capacity for die-casting machines and injection molding machines. Zhongshan base only does injection molding machine business, Ningbo base has two plants, one for die-casting machine and one for injection molding machine. Shenzhen machine, mainly in Ningbo and Zhongshan two bases. In addition, the Fuxin base produces castings, and the Kunshan base mainly does information technology CNC processing.

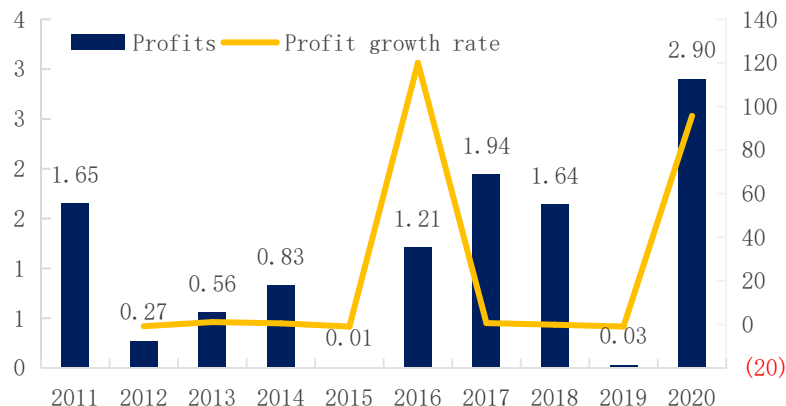


# L.K. Technology: expected to maintain at least a 30% year-on-year sales growth in 2022 and 2023

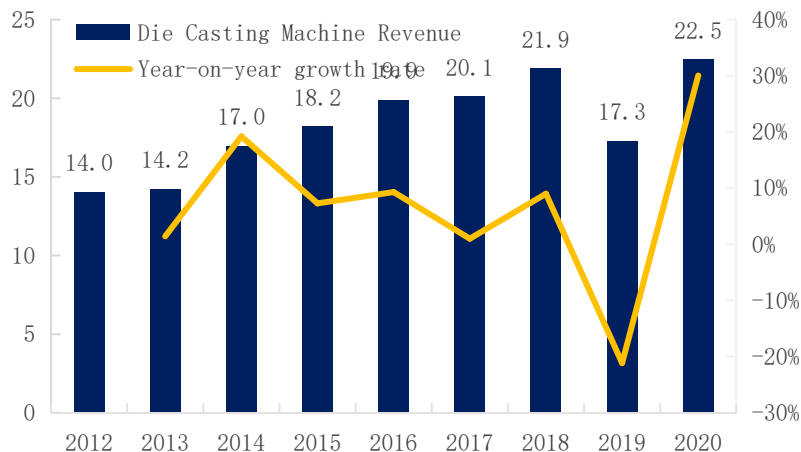
L.K. Technology's revenue and its growth rate (100 mn yuan)



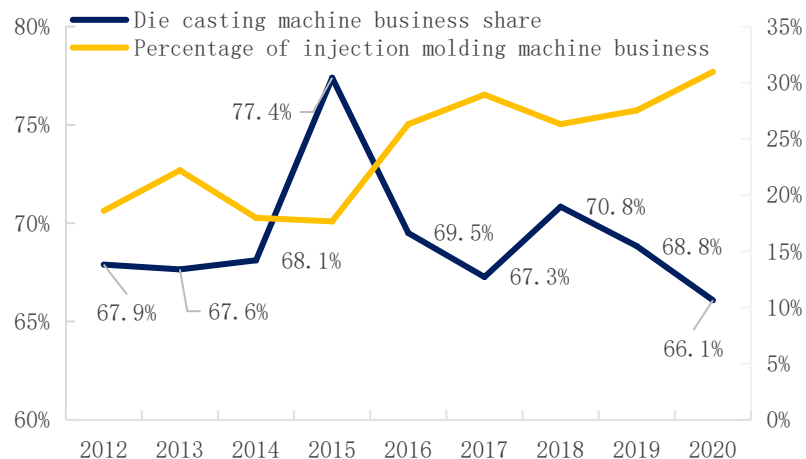
L.K. Technology's net profit and its growth rate (100 mn yuan)



L.K. Technology die-casting machine revenue and its growth rate (100 mn yuan)

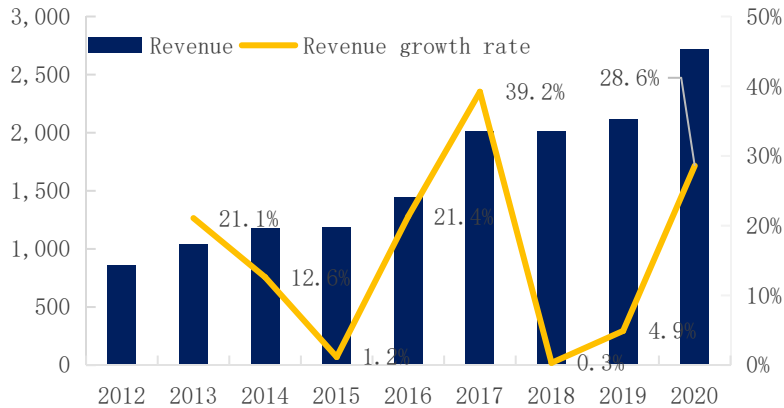


Change in the proportion of die-casting machine and injection molding machine business of L.K. Technology

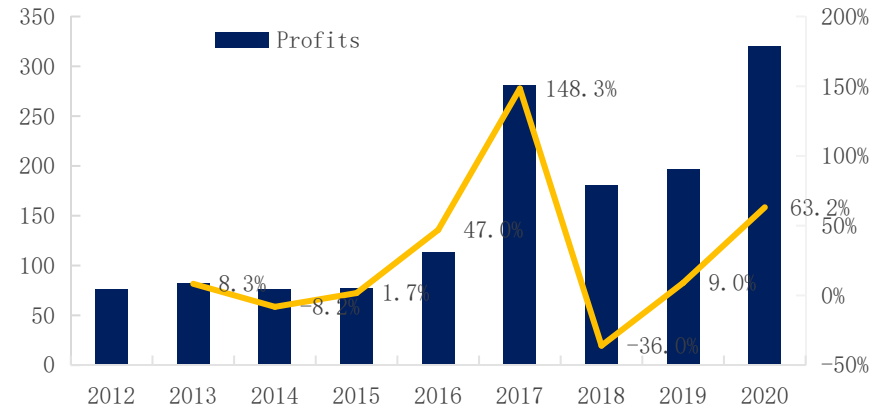


# Yizumi: injection molding machine is its core business. 7000 tons die-casting machine is in the testing stage

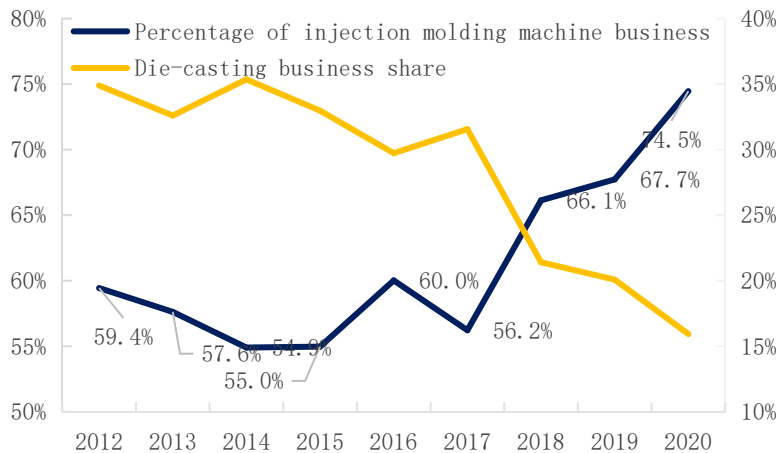
Yizumi's revenue and its growth rate (million yuan)



Yizumi net profit and its growth rate (million yuan)



Change in the ratio of die-casting machine to injection molding machine business for Yizumi



- Yizumi's business mainly includes injection molding machines, die-casting machines, and rubber injection machines. Injection molding machine is the company's core business, and its market share has continued to increase.
- In terms of super-large die-casting machine, Yizumi is currently developing 7000 tons machines, which is in the testing stage.
- Yizumi will have additional production capacity coming onstream in the second half of 2022, and the increase in production value from additional capacity is expected to be around 800 million to 1 billion yuan.
- Yizumi's performance is expected to be stable, and the company expects to maintain a double-digit business growth rate in 2022.



03

## Aluminum Alloy Casting Material Using Heat-Free Technology

# New heat-treatment-free aluminum alloy casting material enabled the application of integrated one large piece die-casting technology

- Car parts manufactured by Integrated one piece die casting are usually large in size, thin walled, have complex structure, easily deformed, and therefore, heat-treatment-free materials and high vacuum die-casting process manufacturing are required.
- Compared with traditional aluminum alloy materials, the performance requirements of heat treatment-free materials are higher. For example, toughness must be greater than 180 MPa and strength greater than 210 Mpa.
- At present, domestic companies with patents for heat treatment-free materials include Lizhong Group, Guangdong Hongjin, and CSMET Group, of which CSMET Group is the agent of Alcoa's products.

## Global progress in the development of heat treatment-free materials

Company	Products	Partner companies	Progress
Tesla	Self-developed	Tesla	Product Phase
Lizhong Group	Self-developed	Wencan Co.	Obtained a patent
Guangdong Hongjin	Self-developed	Guangdong Hongtu	Sample
CSMET Group	Agent	Tesla	Product Phase
Alcoa	EZCAST	--	Product Phase
Rheinland, Germany	Castasil-37	--	Product Phase

# The market potential for heat-treatment-free casting materials is vast, and all major suppliers are expected to have plans for capacity expansion

## Estimated demand for heat-treatment-free materials

Estimated total sales volume of passenger cars	Integrated new tech models	Integrated new tech penetration rate estimation	Number of new integrated die-casting vehicles	Rear floor and front hatch material requirements	Four structural parts material requirements
25 million	21.75 million	30%	6.52 million	782,000 tons	2.2 million tons
25 million	21.75 million	50%	10.87 million	1,304,000 tons	3.7 million tons
25 million	21.75 million	70%	15.22 million	1.806 million tons	5.175 million tons

- There are two types of aluminum alloy casting processes: electrolytic and recycled. Recycled aluminum is aluminum alloy obtained by using scrap aluminum as raw material and going through production processes such as pretreatment, smelting, refining and ingot casting.
- Compared with the production of one ton of electrolytic aluminum, each ton of recycled aluminum produced can reduce carbon dioxide and sulfur dioxide emissions by about 11 tons, save 13,000 units of electricity, save 22 cubic meters of water, reduce ore mining by about 11 tons, reduce solid waste emissions by about 20 tons, and reduce the cost of producing recycled aluminum is at least 20% less than producing electrolytic aluminum.
- As of 2019, total domestic recycled aluminum production capacity stood at 7.25 million tons. The largest supplier is the Lizhong Group with the largest 432,000 tons capacity or only 5.96% of total industry capacity, indicating a very fragmented industry.
- **Lizhong Group** has established 18 plants in Tianjin, Baoding, Hebei and Changchun, Jilin as recycling bases to carry out aluminum scrap recycling business. In addition, the company also has overseas recycling bases in Thailand and Mexico to ensure a stable supply of recycled aluminum.

# Lizhong Group boasts the largest aluminum alloy capacity in China and the largest intermediate aluminum alloy capacity in the world

**Lizhong Group**

Lizhong's three core businesses include: aluminum alloy casting, aluminum alloy wheels, intermediate aluminum alloy

Lizhong's intermediate aluminum alloy capacity is 70,000 tons, the largest in the world; the aluminum alloy casting capacity is 1.2 million tons, the largest in China.

All three core businesses have capacity expansion plans, and the future capacity growth rate is expected to be more than 30%, enabling the company to solidify its market leader position.

Business	Current capacity	Future expansion plans
Aluminum alloy casting	1.5 million tons/year	420,000 tons
Aluminum alloy wheels	18.45 million pcs/year	4.6 million pieces
Intermediate aluminum alloy	70,000 tons/year	35,000 tons

# Lizhong Group: equity incentive plan binds management team's personal interests, shareholders' interests, and company interests

## Lizhong Group February 2022 Equity Incentive Plan

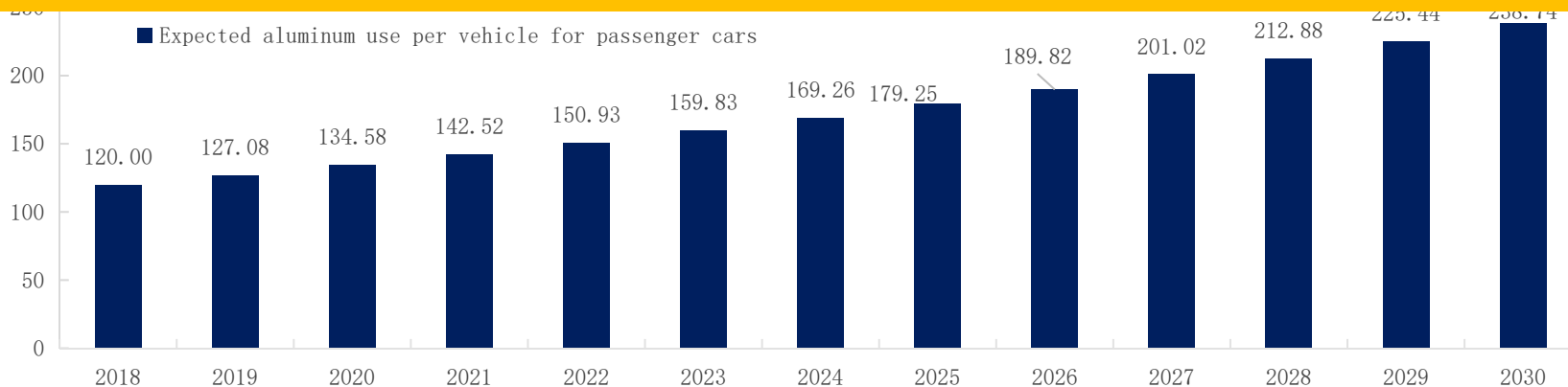
Name	Position	Nationality	Number of shares acquired	Percentage	Percentage of total shares
Zhang Jianliang	Vice President	China	36	1.26%	0.06%
Yan Yuejun	Vice President	China	36	1.26%	0.06%
Wang Wenhong	Vice President	China	36	1.26%	0.06%
Li Zhiguo	Vice President, Secretary of the Board	China	36	1.26%	0.06%
Yang Guoyong	Chief Financial Officer	China	36	1.26%	0.06%
JAROENTHANGS	Middle and Senior Management	Thailand	10	0.35%	0.02%
LEE KUMOK	Middle and Senior Management	Korea	8	0.28%	0.01%
ZHENG	Middle and Senior Management	Canada	7.5	0.26%	0.01%
Other middle and senior management and core technical (business) personnel (289 people)			2,094.50	73.36%	3.39%
Reserved			555	19.44%	0.90%
Total			2,855.00	100.00%	4.63%

- The company issued an equity incentive program in February 2022 to bind the interests of shareholders, the company, and the management team.
- In addition to top executives, the equity incentive ratio of middle management and core technical personnel reached 73.36%, accounting for 3.39% of the current total equity, indicating top management's strong support for the technical personnel in middle management.
- However, the incentive plan has terms and conditions: 2022-2024 net profit of not less than 600 million, 720 million, 864 million, respective, with an average annual growth rate of at least 20%. Top management is optimistic about the company's future performance, and is using the equity incentive plan to motivate and arouse the enthusiasm of the middle and senior management.

# Lizhong Group: new heat-treatment-free alloy casting materials have led to increased sales, lower manufacturing costs, and improved gross profits

- The company received the national invention patent certificate in 2020. The elongation rate is more than 5 times higher than the traditional die-casting material, and the application of low Mo densification technology reduced cost by 15-20% when compared with similar materials abroad.
- The gross profit of the company's cast aluminum alloy business is only about 5.6%, which is much lower than the gross profit margins of aluminum alloy wheel and intermediate aluminum alloy busines at around 14%. The development of heat-treatment-free materials will effectively improve the profit level of the company's aluminum alloy casting business.
- The development trend of producing lightweight vehicles have significantly increase the usage of aluminum alloy body parts. The industry as a whole is set to expand rapidly due strong market demand.

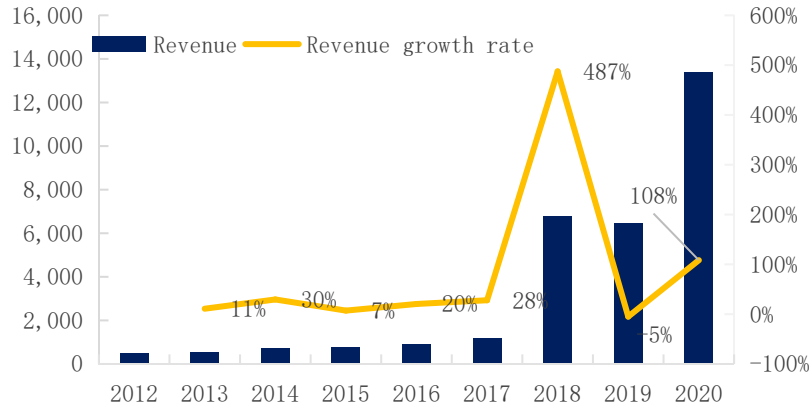
### Estimated aluminum usage per vehicle for passenger cars



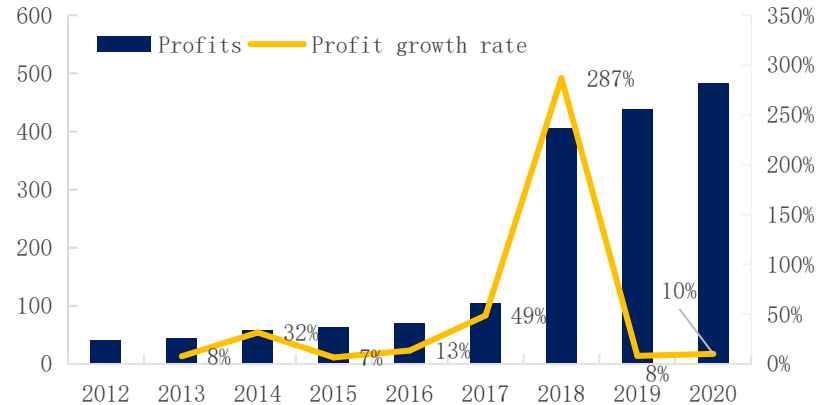


# Lizhong Group expanded their business to aluminum alloy wheels and aluminum alloy die-casting in the past three years, and profits rose significantly

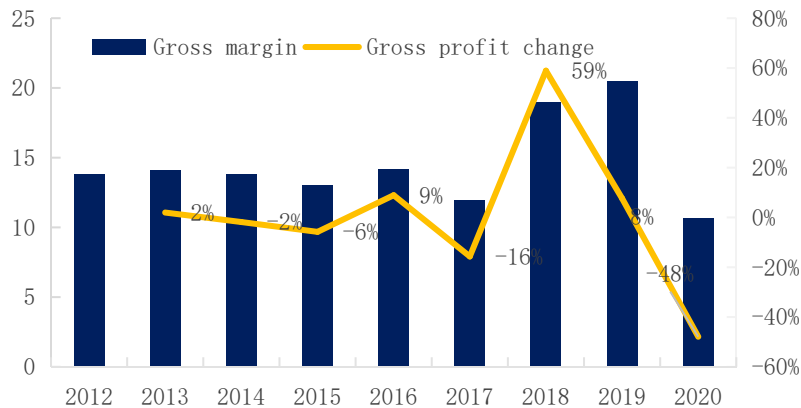
Lizhong Group revenue and its growth rate (100 mn yuan)



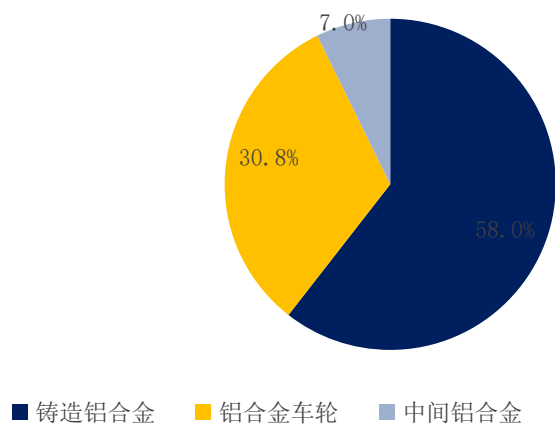
Lizhong Group profit and its growth rate (100 mn yuan)



Lizhong Group Gross Margin



Percentage of the company's business by segment

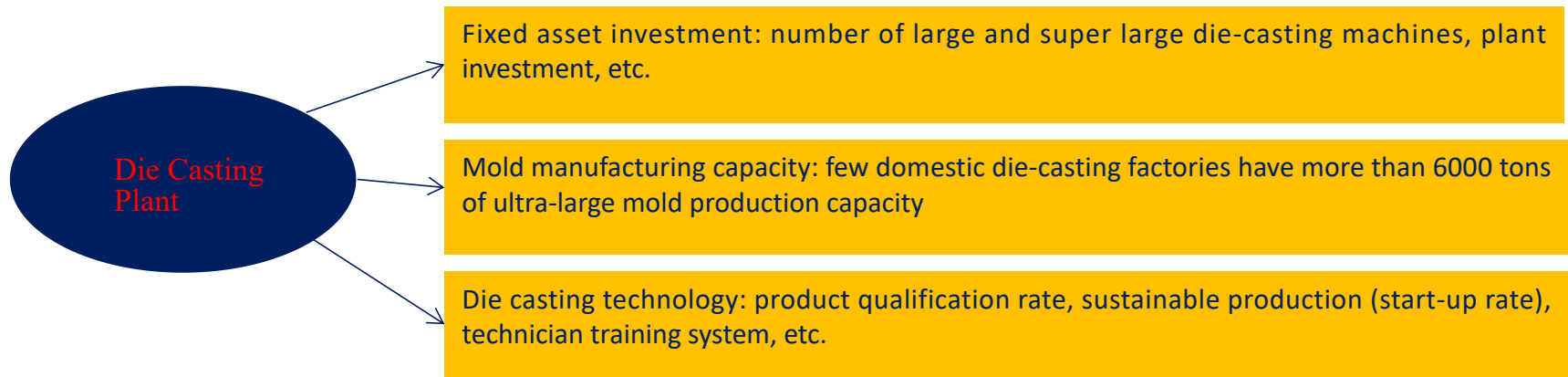




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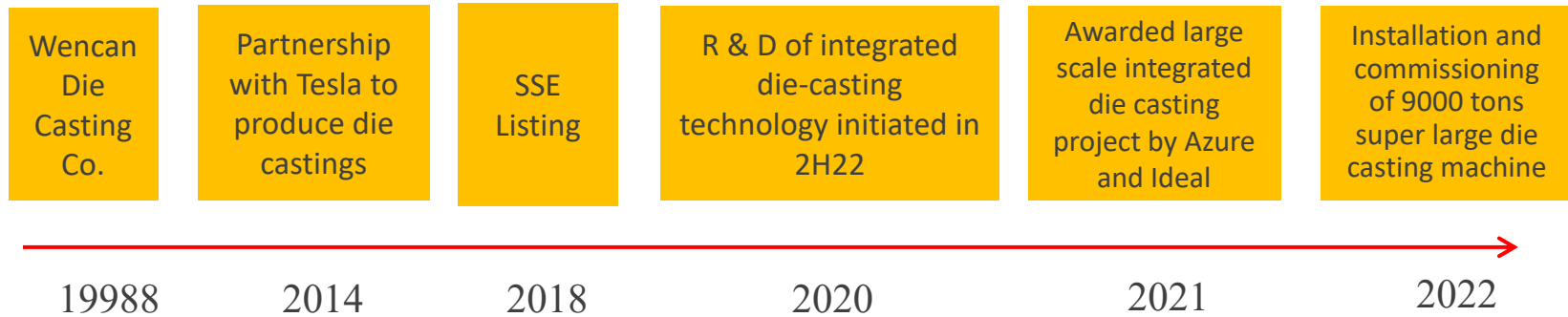
**New integrated die-casting  
technology will become  
mainstream**

# New integrated heat-free die casting factories becoming industry mainstream, new die casting technology act as core barrier to entry



- In terms of die-casting equipment investment, major ultra-large die-casting machine companies include: Guangdong Hongtu, Wencan, IKD, Xusheng, Quanfeng Automotive, Tuopu Group, Millison,...etc.
- In terms of mold manufacturing, domestic die-casting factories use molds that came basically from external procurement, mainly purchased from Guangzhou Xingqiang, Ningbo Heili Technology, Ningbo Sciveda, Dalian Dongli Machinery, and FAW casting. Note: Wencan has its own independent mold technology research and development capability.
- **In terms of mass produced vehicles, the product qualification rate of NIO's ET5 structural body parts manufactured by Wencan is higher than that of Tesla, reaching a product qualification rate of more than 80%.**
- In the short term, die-casting factories with the new die-casting technology and early equipment investment will be the near term beneficiaries. However, in the long term, automakers may upward integrate by investing in or purchasing die casting factories, and as such competition landscape may deteriorate for die casting factories. In addition, die casting factories are vulnerable to upstream raw material supply shortages and price fluctuations.

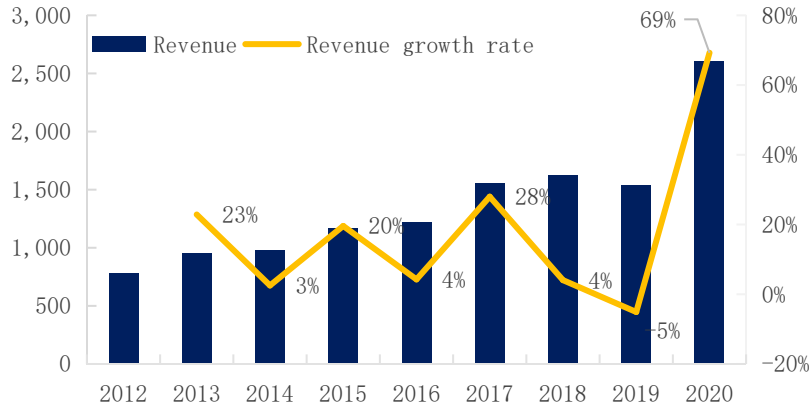
# Wencan: progressing the fastest in terms of the new integrated die-casting technology, and it is a market leader in super-large die-casting technology



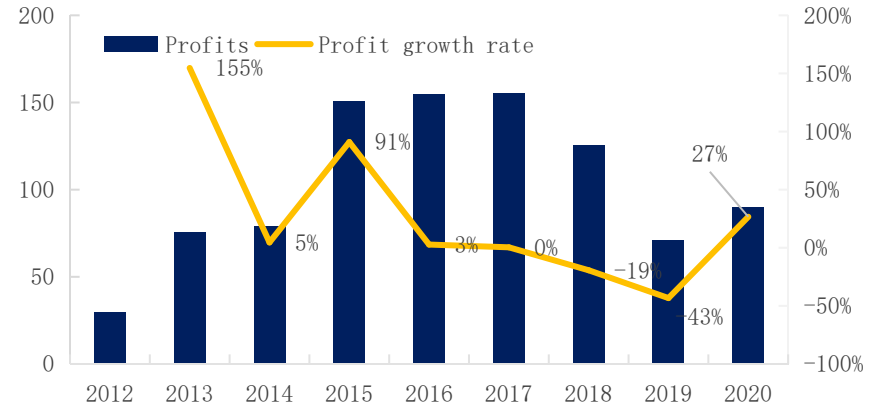
- Wencan's new integrated die-casting technological progression is the fastest in the industry: the company started in second half of 2020 investing in R&D of casting materials, new mold equipment, and other aspects of integrated die casting technology. It has also ordered 8 super-large die-casting machines, including one 9000T and two 6000T machines. Currently, it is carrying out die-casting manufacturing of rear chassis base frame for NIO and Li Auto, and may subsequently develop the capability to die-casting front cabin frame and battery tray structures.
- Wencan is the only enterprise with super-large mold production capacity in die-casting: domestic die-casting plants generally do not have the production capacity of super-large molds, the weight of molds for 6000-ton die-casting machines is above 160 tons, which entails certain requirements from machine tools and mold equipment. The vacuumed die-casting of body structure parts also has high requirements for mold equipment. Therefore, Wencan has certain technical advantages that serve as its comparative advantages and act as barriers to market entry in the die-casting sector.
- Wencan expects mass production of new integrated die casting products in the second half of 2022. Sales revenues from NIO9 may be reflected in the company's earnings report during 2H22. It is expected that the company will experience fast sales growth rate in 2022 and 2023.

# Wencan: new sales orders of integrated die casting of rear chassis base frame from NIO and Li Auto to initiate significant future growth in sales and earnings

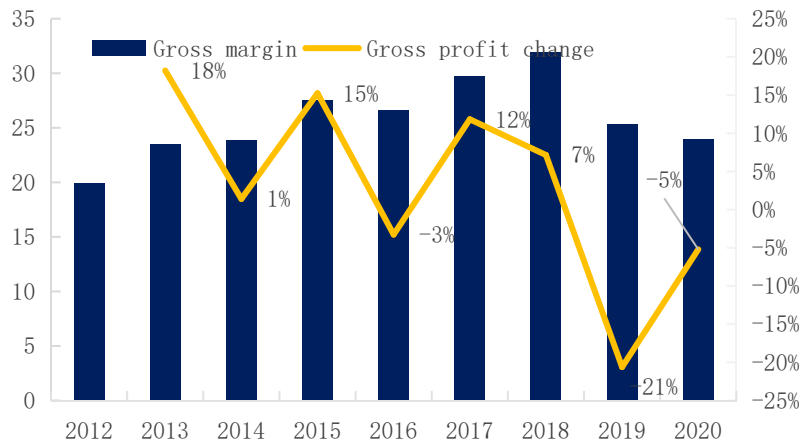
Wencan's revenue and its growth rate (100 mn yuan)



Wencan's profit and its growth rate (100 mn yuan)



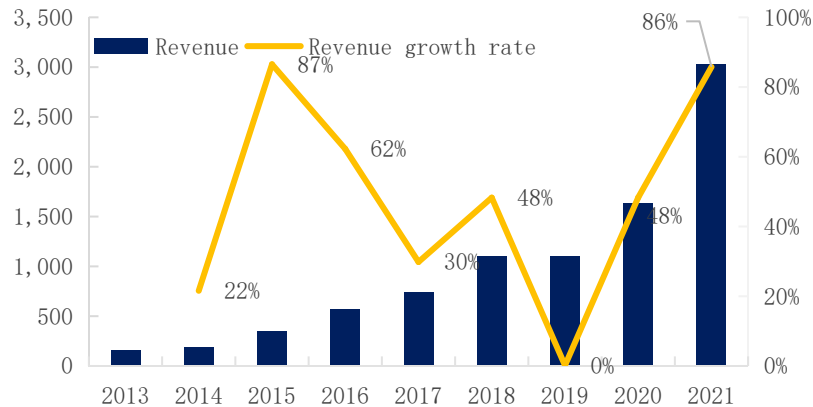
Wencan's gross sales margin



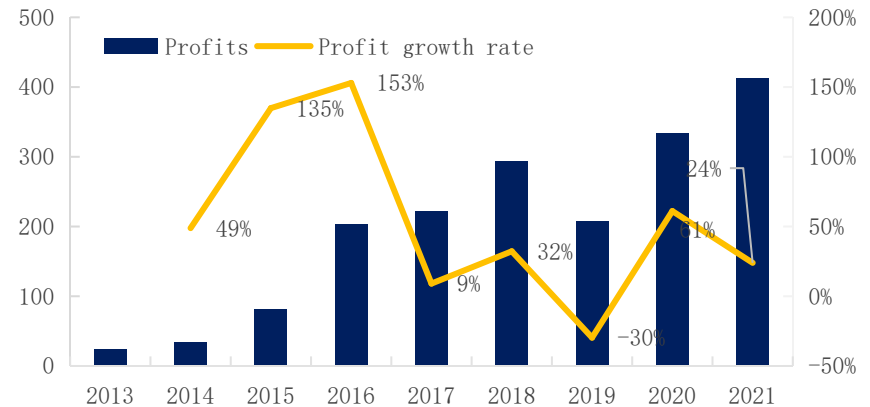
- The company completed the acquisition of the French Baillie Group in December 2020 resulting in a significant increase in revenue and profit in 2020.
- Wencan's main manufacturing bases are located in Foshan, Nantong, Yixing, Tianjin and other places in China. It also has large manufacturing and R&D bases in Dalian, Wuhan, Hungary, Serbia, Mexico, France and other European and American countries. As a result, it is expected that the company's overseas revenue will significantly increase.
- In 2021 and 2022, the company die-casted NIO and Li Auto's rear chassis base frame, and further sales and earnings growth is expected.

# Xusheng: 86% revenue growth and 24% profit growth in 2021, but rising shipping costs as well as higher raw material costs have led to a lower gross margin

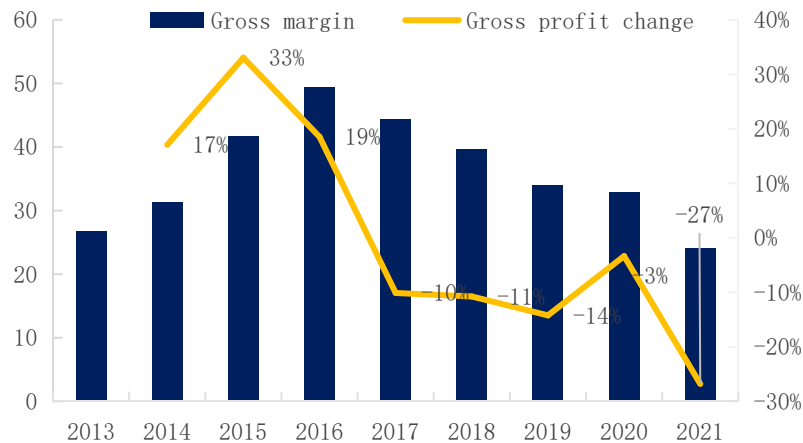
Xusheng's revenue and its growth rate (100 mn yuan)



Xusheng's profits and its growth rate (100 mn yuan)



Xusheng's gross profit and gross margin



- Founded in 2003, Xusheng Auto Technology (603305.SS) is a supplier of automotive parts for new energy vehicles with a focus on making NEV lightweight. It is mainly engaged in the research and development, production, and sales of precision aluminum alloy automotive parts and industrial parts.
- Factors such as higher raw material prices and increased shipping costs have led to a gross margin erosion to 18.3% in the fourth quarter of 2021, down 9.95 percentage points year-on-year.
- The company's aluminum die-casting business is benefiting from the continued release of orders on hand and the business division is expected to maintain a high sales growth rate in 2022.

# Thank You!

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All data and information in this report are sourced from Wind, Global Insight, CEIC, Bloomberg, Haver, BEA, NBER, and HZI estimates, unless otherwise specified.

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### Contact Us

**Ye (Stephie) Yu**

Director of Global Business

[global@hzinsights.com](mailto:global@hzinsights.com)

708 Main Street 6<sup>th</sup> Floor, Houston 77002

210 Century Avenue, 12 F Suite 1206, Shanghai, 200120, China