

aleees



立凱電

# Investor Conference

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The Chinese version shall govern all matters stated herein.



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# Introduction



# Organization

**Advanced Lithium Electrochemistry (Cayman) Co., Ltd.**

Founded on Nov, 2007

Stock quote: 5227.tw

**Advanced Lithium Electrochemistry (TAIWAN) Co., Ltd.**

Founded on April, 2005

《Catode Materials》  
•Manufacture  
•Sales  
•Research and development

**Advanced Lithium Electrochemistry (HK) Co., Ltd.**

Founded on July, 2009

《Cathode Materials》  
•Sales

**Advanced Lithium Electrochemistry (China ShanHAI) Co., Ltd.**

Founded on January, 2010



# Main Products

Cathode Materials -- Olivine-based and Ni-based layered oxides

Most advanced wet process in the world - Produce the longest life cycle of Cathode Materials for Lithium Ion Batteries



## Advantages

Long life cycle, stable quality with good batch consistency, customizable.

192 global patents: 107 internally developed, acquisition of 85 globally licensed patents from HQ

## Applications

New energy vehicle battery, energy storage system

Replacement of lead acid batteries in start/stop system for 12V and 48V

## International Clientele

Certified by customers from Japan, Korea, Europe, and the U.S.





# Company History

- Announced LFP-NCO Technology
- Mass production on olivine - based cathode materials for lithium ion batteries

- Listed on Exchange in Taiwan

- Became a qualified supplier of Japanese and Korean battery manufacturers
- Participated in global automotive supply chain in Europe, Japan, Korea, and the U.S.
- Top 5% among companies listed on Taiwan Stock Exchange for six consecutive years
- Accumulated to 2019, sales of cathode materials for Lithium-ion battery is over 13,000 tons globally

2005

- First Founded

2007~8

- Acquisition of patent licensing from Goodenough for carbon packaging and olivine structure manufacturing processes

2011

2013

2018

- Transformed from China EV battery market into the global automotive supply chain and energy storage market

2019



# Competitive Advantage

## Long Life Cycle



- Cycle life could reach 10000 times.
- Excellent batch consistency.
- Conductive speed enhanced one million times.
- Adding metal oxides to inhibit precipitation of iron ion.

## Advanced Carbon-coating Technology



- Particle surface area have been coated for more than 2x by carbon content.
- Provided longer cycle life and higher power rate for customers' products..

## High Reputation



- 192 global patent: 107 self-owned patents, and 85 global patents licensed from HQ.
- Accumulated to 2019, sales of cathode materials for Lithium-ion battery is over 13,000 tons globally .

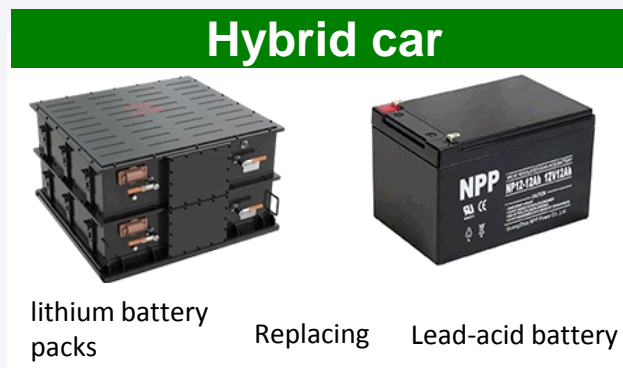
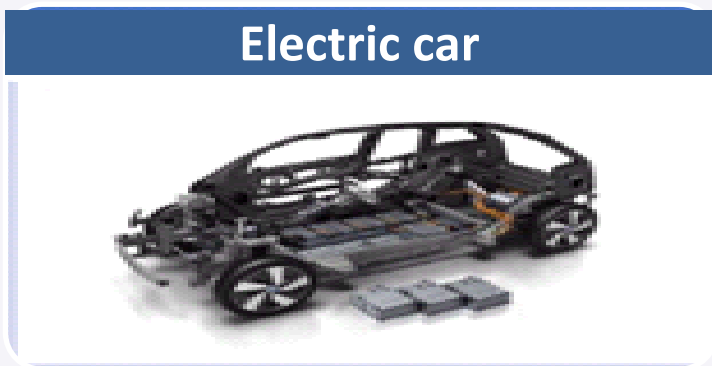
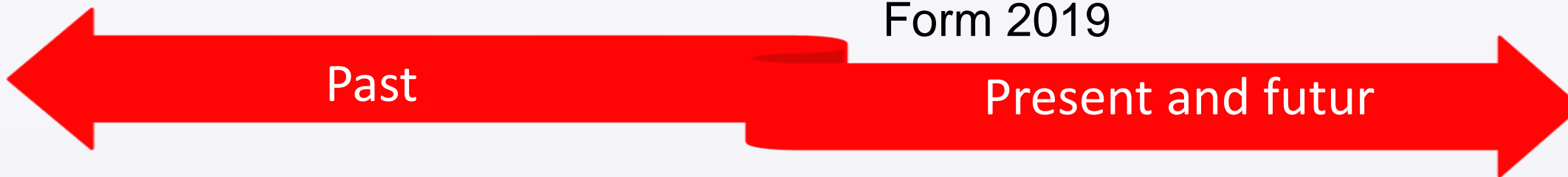


# Operational overview





# Enter new niche markets



**Product end application market changes**

The main market in the past  
China's EV market

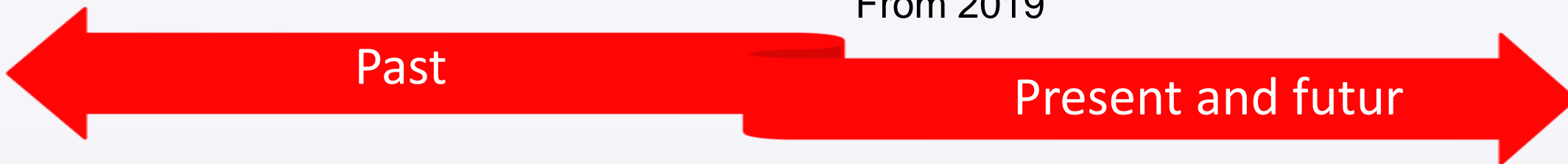
Become a qualified supplier of Japanese and Korean battery manufacturers, penetrate into the market of replacing lead-acid battery with lithium-iron battery, and enter the automotive supply chains in Japan, Korea and Europe and America.

Cooperate with a well-known manufacturer of electronic component and consumer goods in Japan · battery manufacturers in Europe and America to enter the high-end household and industrial use energy storage market

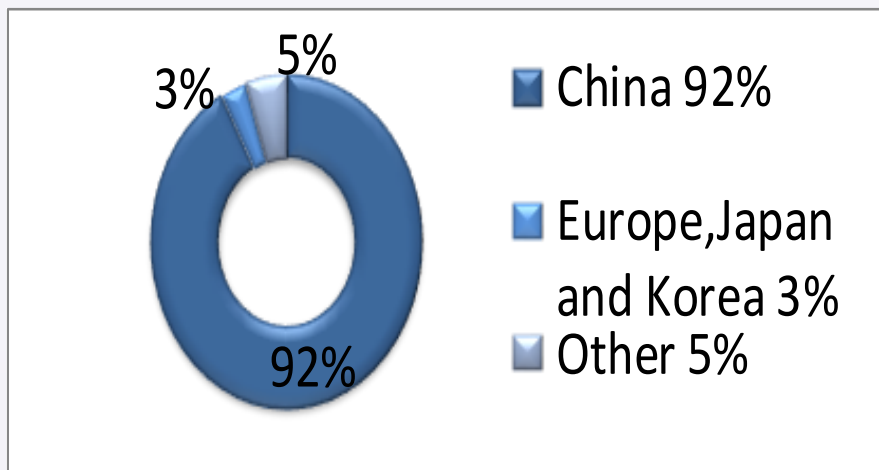


# Expand markets in Europe, America, Japan and Korea

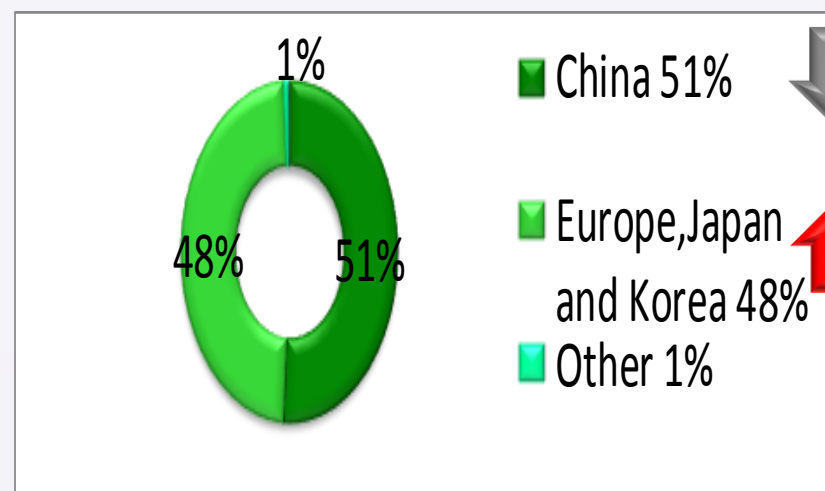
From 2019



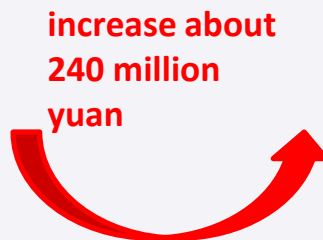
Customer base changes



The sales revenue in 2018 is about 150 million yuan



The sales revenue in 2019 is about 390 million yuan



Proportion of Chinese customers ↓ 41%

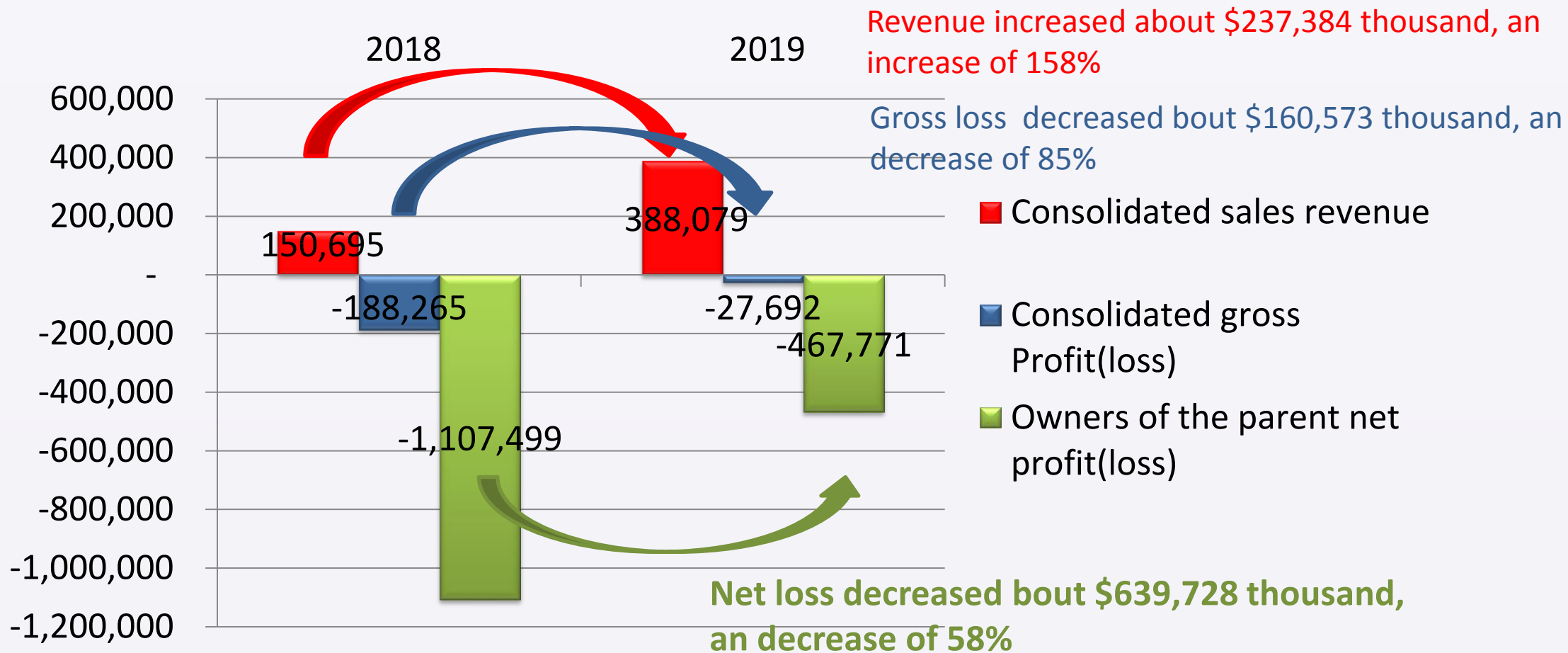
Proportion of customers in Europe, Japan and South Korea ↑ 45%



# 2019 year & 2018 year

Transformation Gradually Achieved Significant Results and Revenue Growth, with Operating Performance Improved

( NT Thousand )

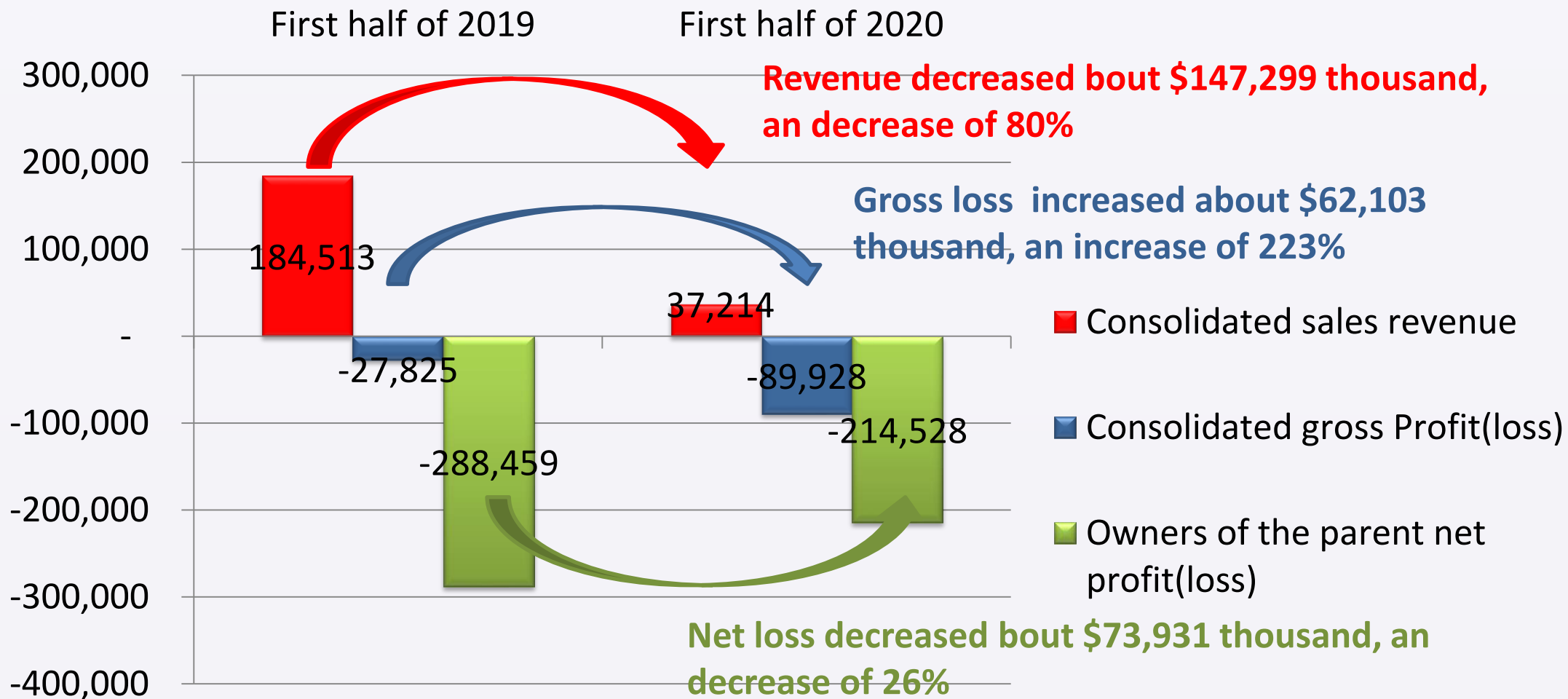




# First half of 2020 & first half of 2019

Revenue decreased due to the effects of COVID-19

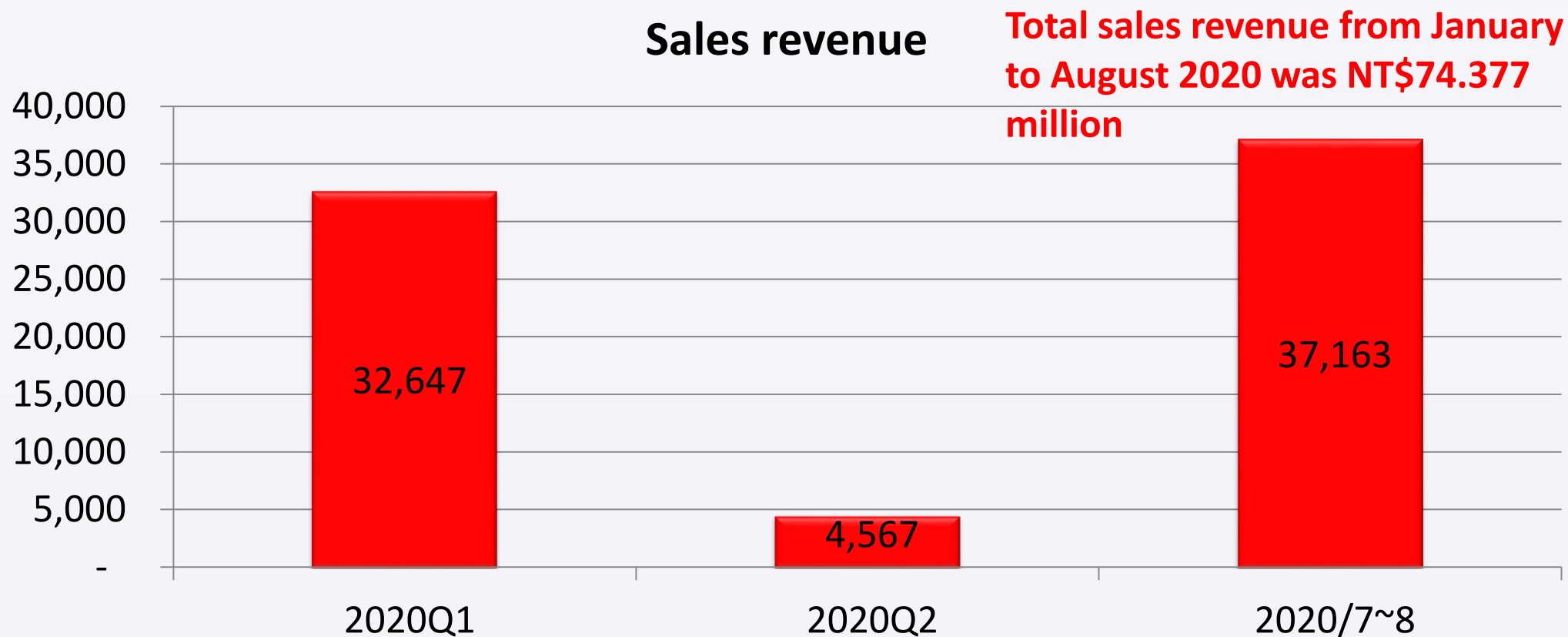
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# Sales revenue from January to August 2020

( NT Thousand )





# **Product Terminal Application- Development of Energy Storage Market**

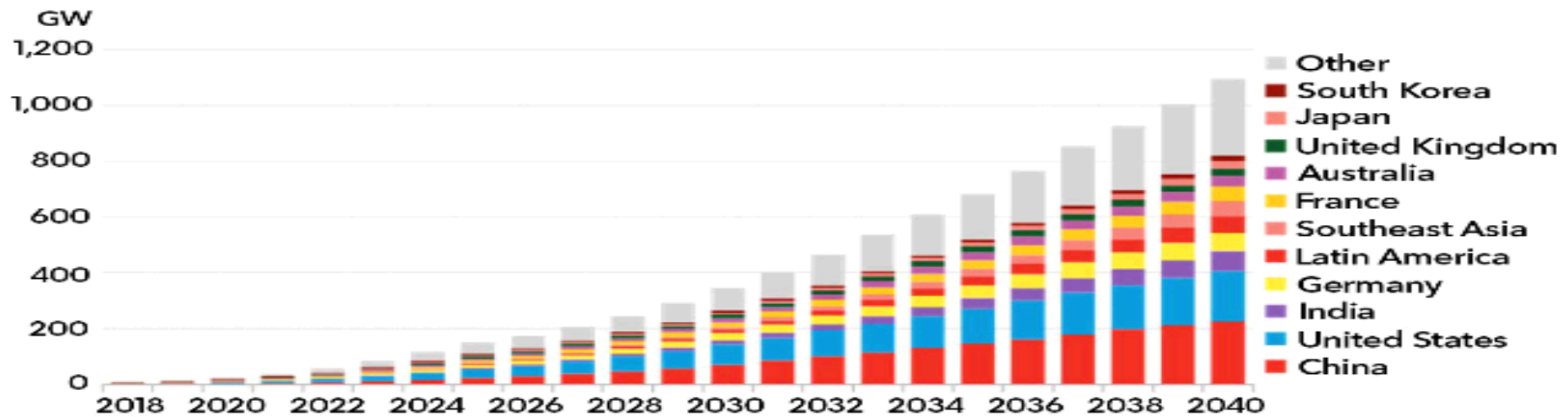




# Development of the Global Energy Storage Market (I)

- As shown by the latest report released by the market research agency, Bloomberg NEF (BNEF), the global capacity of energy storage will grow 122 times in the next two decades, which will reach 1,095GW / 2,850GWh by 2024, with the total investment amount reaching as high as US\$662 billion. The momentum is driven by the demand for stationary energy storage and EV batteries.
- According to BNEF, the cost of lithium batteries will be reduced by 50% in the next decade, and the newly installed energy storage systems will be grid-connected. Therefore, the combination of renewable energy and battery energy storage will take up the leading position in the new era of “disposable renewables”.
- South Korea was the world's largest energy storage market in 2019. However, China and the United States will become the world's top two energy storage markets by 2024.

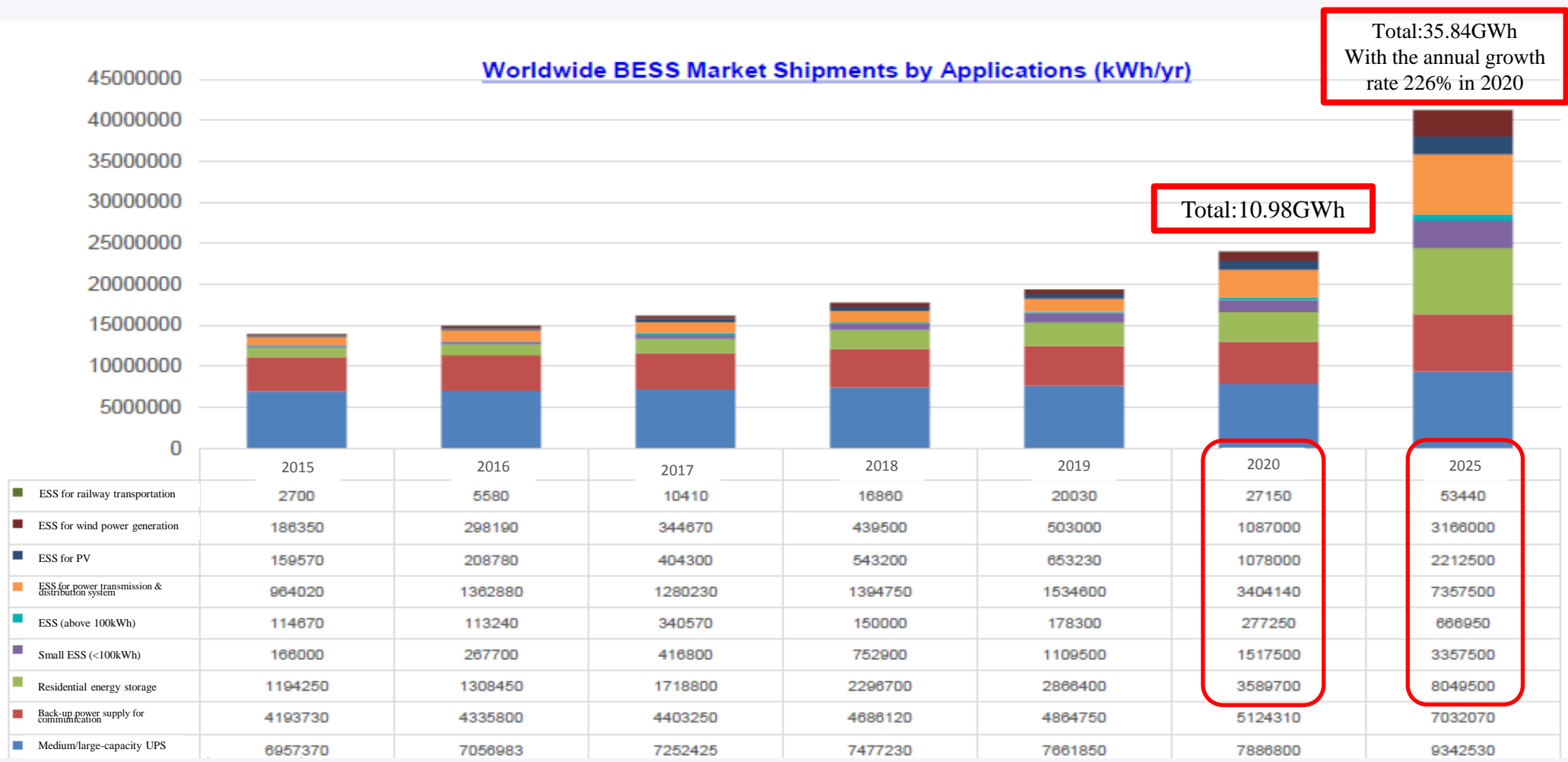
Global cumulative energy storage installations



Source: BloombergNEF



# Development of the Global Energy Storage Market (II)-ESS& Residential Energy Storage Forecast



# Development of the Global Energy Storage Market (III)- Lithium Battery BESS

- According to TrendForce's Green Energy Research (EnergyTrend) survey, the transformation from centralized energy generation to smart distribution grid (SDG) has become an inevitable trend for future smart cities. The global capacity of BESS will reach 3.2GWh in 2020, moreover, the CAGR during 2019~2024 will reach 22%.
- As there are higher requirements for power plants in terms of carbon emission reduction, new power plants should also pass the strict inspection for environmental impact. Optimized power structure also becomes an important smart trend for the power industry. ESS is taken as the best power buffering device, and plays multiple critical power roles at the same time, to achieve the goal of improving power generation efficiency for the traditional power plants or increasing the proportion of renewable energy power generation.
- As for the energy storage components, battery still takes up a critical position. Benefiting from the development of EV, the capacity of lithium battery has achieved expansion continuously, which results in more competitive pricing of batteries in the market, and promotes the emerging energy storage market.

Figure: Global BESS Installation Capacity Forecast (Grid Connection)



Source: TrendForce, Feb., 2020



# Development of the Global Energy Storage Market (IV)- Introduction in Countries Worldwide

## Energy storage market in North America

- It can be divided into three categories: energy storage in front of the meter (power generation, transmission and distribution), residential energy storage, and industrial energy storage.
- In accordance with the investment tax credit (ITC) and the Modified Accelerated Cost Recovery System(MACRS) tax incentives, the scope of subsidies and incentives was expanded from solar energy to ESS in 2016, which was granted with 22%~30% cost credits.
- As for the residential energy storage, due to the high electricity price (23~30cent/kWh) in regions such as California and Hawaii, the demand for energy storage from residential users increased. Tesla and Sunrun have released the solar energy systems with ESS. The market mechanism of electricity pricing has successfully generated demand for ESS.

## Europe

- A considerable amount of renewable energy power plants have been built. It will focus on the demand for off-peak power storage. In recent years, residential ESS has been actively installed in many regions such as Germany.
- In the UK, the application on the power generation side is the key. When solar energy and energy storage are set up simultaneously, it is mostly to resolve the problem of peak power consumption. Especially when the seasonal power consumption is increased due to heating, the power generation side must be equipped with the facility to balance the power consumption of peak and off-peak hours. In the UK's demand side resource (DSR) bid in early February, the agreed capacity reached a market size of more than 100MW in one year.

## Asia

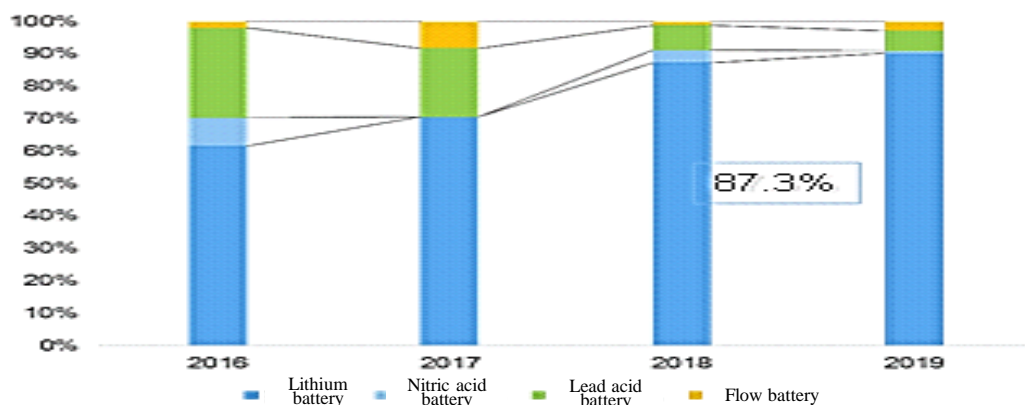
- The electricity auxiliary service market in China will be transformed from the current price mechanism in which the government provides basic subsidies to the electricity retail market mechanism. In the long run, it will be likely to expand the application of energy storage in the grid, and it will also increase the market for energy storage behind the meter.
- Japan also set up nearly 500,000 residential solar grid-connected systems since 2009. The 10-year preferential power purchase has also expired, which has promoted the demand for energy storage applications in the modification market. Japan's policy requires renewable energy power plants to be equipped with ESS for stable output.

In the long run, the development of the IoT will make the trend of smart grids more obvious. Together with the incentives such as power transmission efficiency and reduction of carbon emissions from power generation, the energy storage market will be expanded continuously.

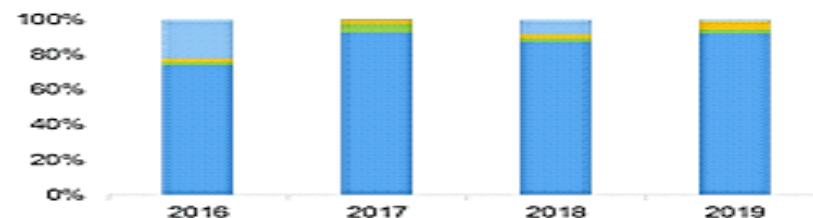
# Development of the Global Energy Storage Market (V)- Lithium Battery

- Lithium battery is the electrochemical energy storage technology that grows the fastest and takes up the highest proportion in energy storage applications.
- Lithium battery energy storage products have seized more than 80% of the market share, with cost advantages and diversified applications. With a rapid cost decline and outstanding performance, it could meet the major needs of grid-level energy storage, and take the place of lead-acid batteries to become the mainstream technology in the small and medium-sized energy storage application market technology.

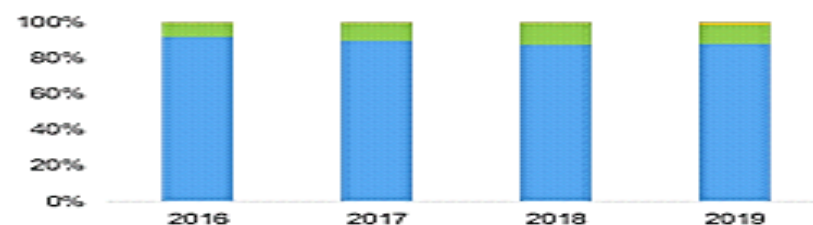
Global Application Trend of Stationary Energy Storage Technology



Application Trend of Grid-level Energy Storage Technology



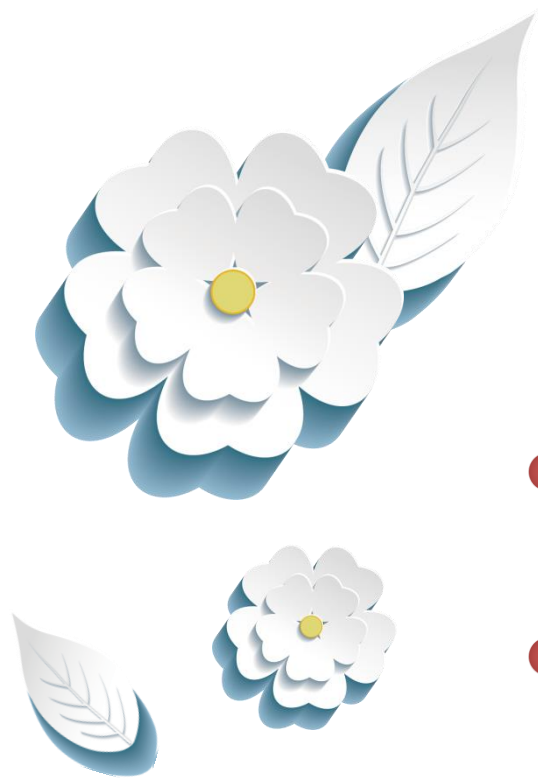
Application Trend of Industrial and Residential Energy Storage Technology



Technological maturity, **cost and financing capability** are the challenges for various energy storage technologies

Source: IEK, ITIR(2019/06)

- As shown by the data released by BNEF, the average price of global lithium battery packs in 2019 has dropped by 87% if compared with that in 2010, which was about US\$156/kWh. The average price of lithium battery packs in China was the lowest, namely US\$147/kWh.
- As estimated by BNEF, the price of lithium battery is expected to drop to US\$150/kWh during 2020~2023, reaching an economic turning point for ESS application.



THANK  
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