KAORI 50+
Go For Sustainable Future

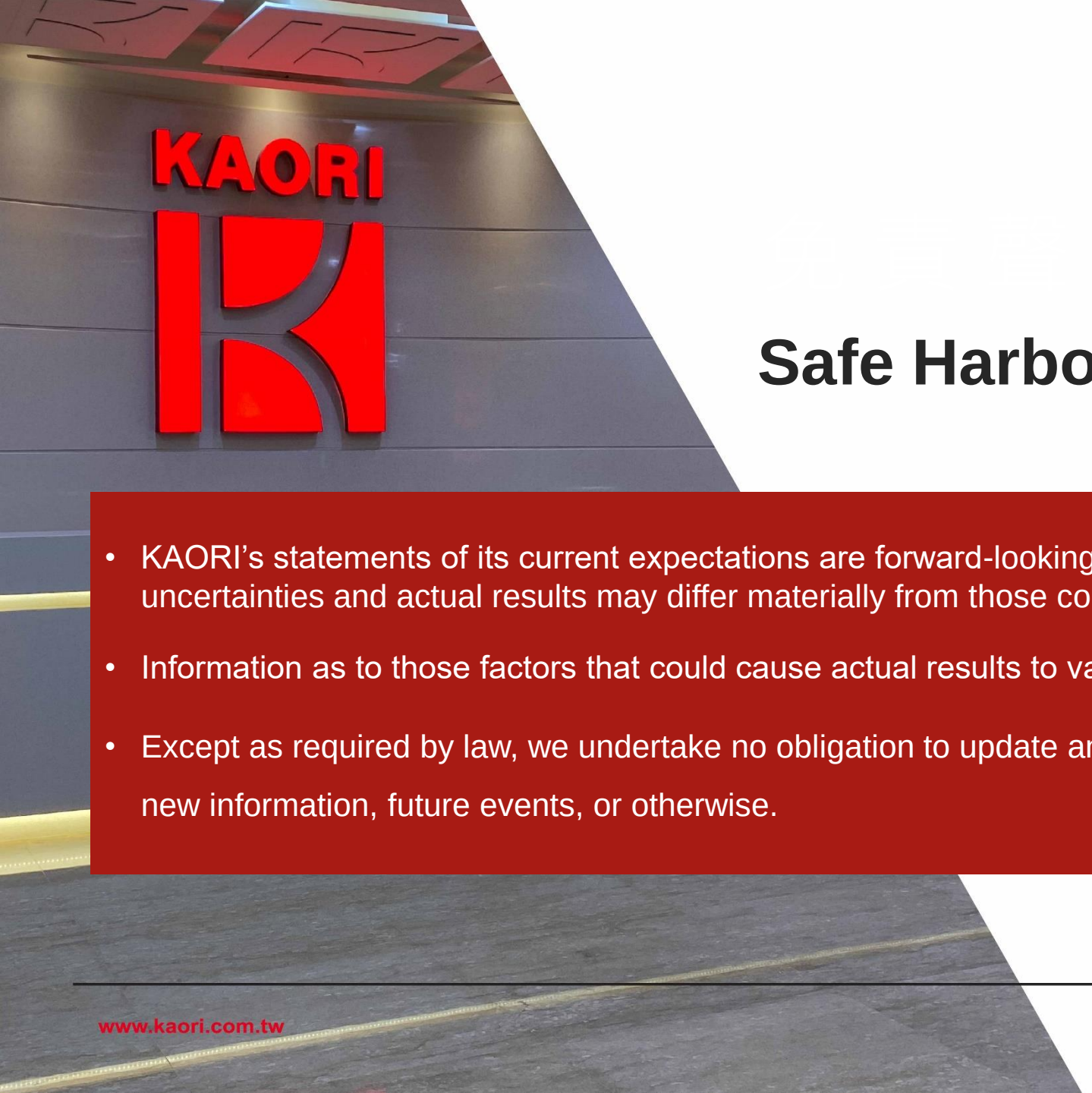
KAORI HEAT TREATMENT CO., LTD.

Investor Meetings 2022

November, 25th, 2022

www.kaori.com.tw

Innovation、Quality、Responsibility、Honor



Safe Harbor Notice

- KAORI's statements of its current expectations are forward-looking statements subject to significant risks and uncertainties and actual results may differ materially from those contained in the forward-looking statements.
- Information as to those factors that could cause actual results to vary can be found in KAORI's Annual Report.
- Except as required by law, we undertake no obligation to update any forward-looking statement, whether as a result of new information, future events, or otherwise.

Agenda

- **Company Profile**
- 2022 Business Results and 2023 Outlook
- Q & A

  Reference: 3Q22 Financial Results

About KAORI

Since 1970, the company's major goal has been to pursue cutting-edge heat treatment technology and to manufacture world-class products.

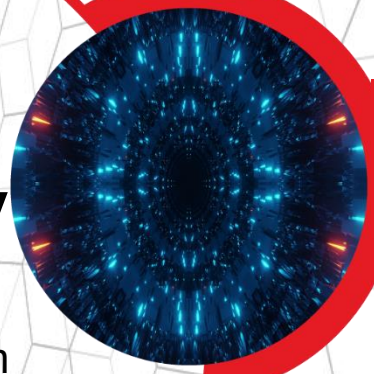
※Group employees: 563 in Taiwan; 64 in Ningbo, a total of 627. Statistical deadline 2022.11.23

Five Key Technology

Develop energy-saving and environmentally friendly green products / systems

Heat Transfer
Heat Flow

Welding
Process



Thermal
Management

System
Integration

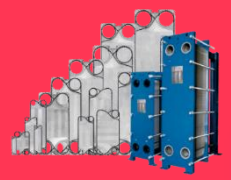
Hydrogen
Applications

Core Business

Three energy-saving and environmentally friendly green products / systems to help customers achieve ESG **carbon reduction goals**

Energy Saving

BPHE



GPHE

Cooling

Immersion Liquid Cooling

Hydrogen

SOFC key components

Hydrogen Fuel Cell
Hydrogen Generator

Waste Hydrogen Treatment System

Sustainable Development Strategy

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Governance

Establish a sustainable governance structure to promote sustainable affairs
Establish ESG Promotion Committee and Carbon Management Committee

Communicate

Establish a communication platform with

- ✓ ESG Sustainability Report
- ✓ Climate Risk Opportunities Report
- ✓ Sustainable Supplier Exchange Meeting

Focus

Develop sustainable products and low-carbon emission reduction technologies
Focus on major issues
Link to the United Nations Sustainable Development Goals

Implement

Formulate carbon reduction / energy saving goals and implement specific practices

- ✓ ISO14064-1 GHG inventory certification
- ✓ ISO14067 Product carbon footprint certification
- ✓ International Carbon Tariff (EU 2023/ North America 2024)

First ESG Corporate Sustainability Report

Deeply plowing Taiwan for half a century to realize the commitment to

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Key Sustainability Achievements Outlined In The 2021 Report Include

ENVIRONMENT

Reduce GHG Emission
Received ISO 14064 Greenhouse Gas Emission verification by the third-party assurance

Clean Energy Investment
Installed rooftop photovoltaic systems totaling **744.51kW** in capacity at kaohsiung plant

SOCIAL

Diversity & Equity & Inclusion
22% are female of managerial roles, **12** foreign employees

Career Development
100% employees passed performance evaluation
7,141 hours of training in total, averaging **15** hours per employee.

GOVERNANCE

Sustainable Supply Chain Management
Ensure critical suppliers complete the Sustainability Management Self-assessment Questionnaire

Develop Low-Carbon Technology
Keep investing in R&D to drive innovation

2021
ESG report

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- **2022 Business Results and 2023 Outlook**

Plate Heat Exchanger

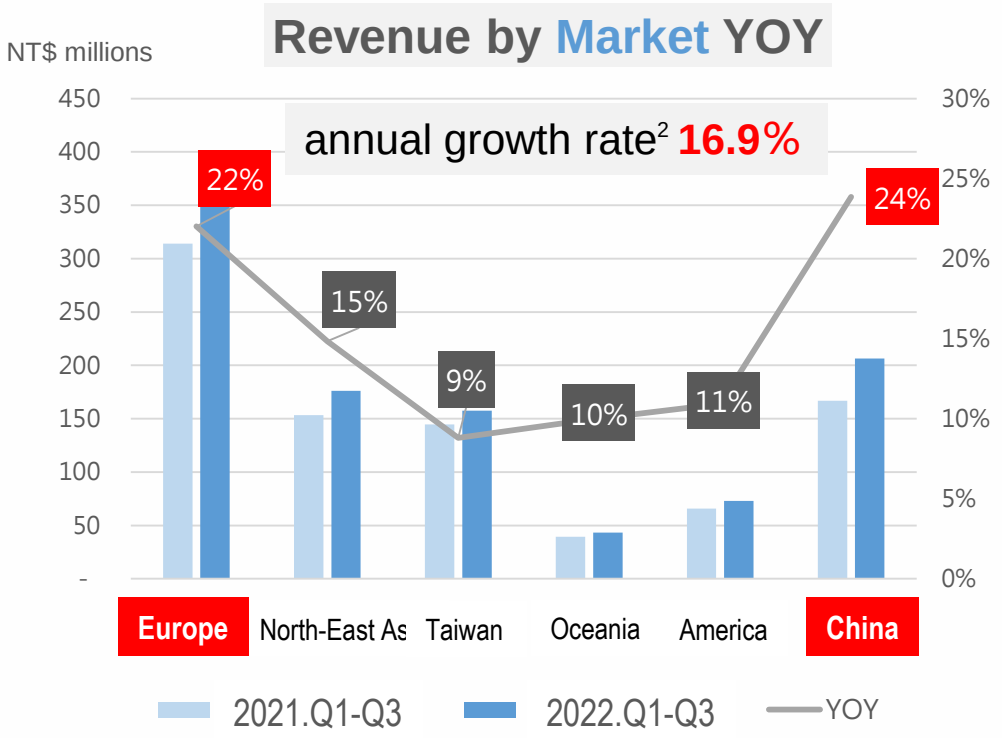
Hydrogen Clean Energy

Immersion Liquid Cooling

Plate Heat Exchanger Review (1)

2022 global market size 978 Million,
KAORI market share 5.1%

Market	Growth Momentum
Europe	• European RepowerEU plan, heat pump demand growth • The price of natural gas has risen, and the government has temporarily stopped selling boilers, and heating equipment will gradually be replaced by heat pumps and district heating
China	• The government encourages the new energy industry, and the demand for fuel cells increases • 2060 carbon neutrality target, demand for heat pump district heating rises



1.MarketsandMarkets-Brazed Plate Heat Exchangers Market https://reurl.cc/AyylWd
2.Annual growth rate ：2021.Q1-Q3 VS. 2022.Q1-Q3

Plate Heat Exchanger

Review (2)

Market	Growth Momentum
Heat Pump	• Replacing gas water heaters, the original boiler manufacturer transformed into a heat pump manufacturer
Air Dryer	• The manufacturing industry is booming, and the demand for plant expansion and maintenance has increased significantly
Fuel Cells	• China and U.S. hydrogen energy policy subsidies

Revenue by Industry YOY

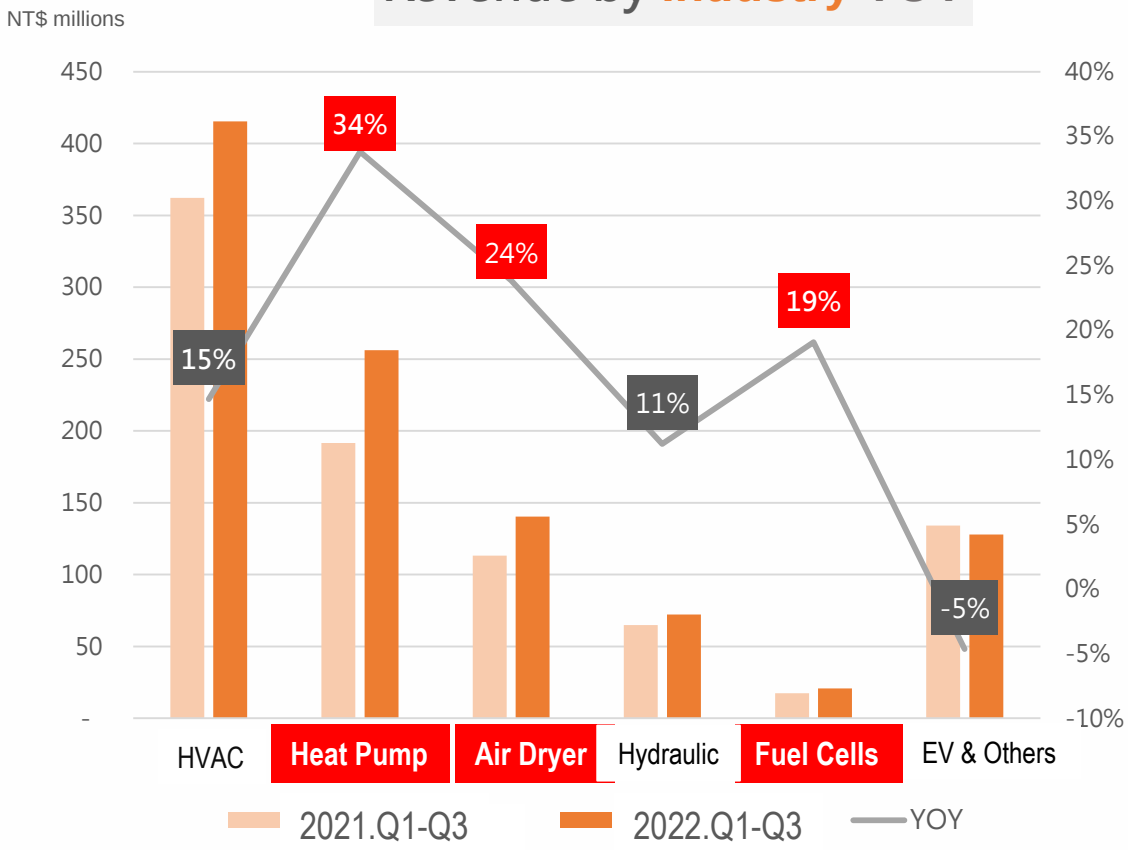
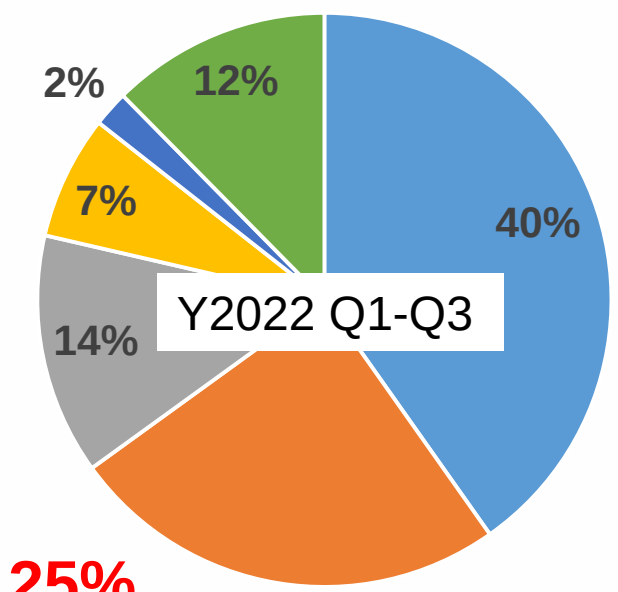


Plate Heat Exchanger

Outlook

In 2023, the main growth will be in the **heat pump industry**

- HVAC
- Air Dryer
- Fuel Cells
- **Heat Pump**
- Hydraulic
- EV & Others



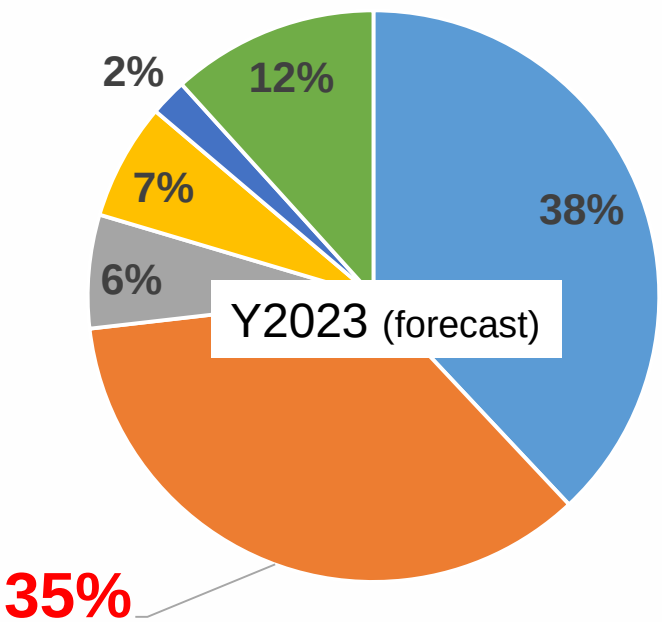


Plate Heat Exchanger

Product Roadmap (Y2023)

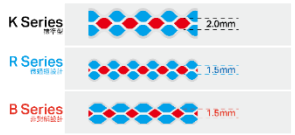
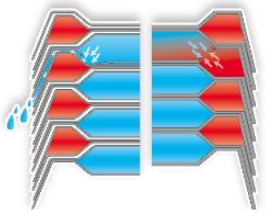
Product Series	Applications	The Purpose of Development	Features	Model	Launch in
 B Series	Heat Pump	• European heat pump replaces natural gas boiler • Jointly developed with heat pump manufacturers	• Asymmetric design • Suitable for next generation refrigerant • Reduce refrigerant charge • Balance between performance and pressure drop	B110	2023.Q1
				B080	2023.Q2
				B076	
				B200	2023.Q4
 D Series	Drinking water and heat pump	• The industry's first large-scale double-layer protection mechanism • Avoid communicating fluids from contacting the human body • Compliance with regulations	• Patent design • No intercommunication risk	D206	2023.Q1

Plate Heat Exchanger

2023 Outlook (1) — Factory Expansion & Recruitment of Key Talents

- The expansion of the Kaohsiung Plant area was completed, adding 7,854 m^2, and the total plant area reached 17,299 m^2. (2022/05)
- Renewable energy investment: 744.51kW photovoltaic system. (2022/09)
- Recruitment of key talents: mechanical and electrical integration of automation equipment, manufacturing management, industrial engineering and quality assurance related talents.

Before expansion 9,445 m^2

After expansion 17,299 m^2


Photovoltaic System744.51kW

Plate Heat Exchanger

2023 Outlook (2) — Capacity Planning & Automation Equipment

- Vacuum furnace expansion plan for production equipment, expected to increase production capacity by 40% in 2023.
- Expansion of consistent plate stamping production line.
- Adopt automated production equipment to improve production efficiency
  - (1) Automatic inspection equipment
  - (2) Install robotic arms to carry plates
  - (3) Install mechanical arms on lathe production lines
- Actively looking for new factories for future expansion.

- **2022 Business Results and 2023 Outlook**

Plate Heat Exchanger

Hydrogen Clean Energy

Immersion Liquid Cooling

Hydrogen Clean Energy

2023 Outlook

Support international manufacturers
Bloomenergy
Promoting Hydrogen Application Technology

Product	Growth Momentum
SOFC (Natural Gas) Solid Oxide Fuel Cells	• Successfully developed 75kW power generation equipment and will move on the mass production stage in 2023 • Bloom Energy Fuel Cell Platform Approved to Enter European Market (2022/6/21) • Bloom Energy Drives Landmark Decarbonization with Ferrari (2022/6/23)
SOFC (Biogas) Solid Oxide Fuel Cells	• Bloom Energy's Dairy Farm Installation Receives National Recognitions for Biogas Innovation and Sustainability Achievements (2022/7/18)
SOEC (Electrolyze) Solid Oxide Electrolyzer cells	• LSB Industries Turns to Bloom Energy to Build 10 MW Solid Oxide Electrolyzer for Large-Scale Green Hydrogen Production(2022/5/24) • Westinghouse and Bloom Energy Sign Letter of Intent to Accelerate Zero-Carbon, Large-Scale Hydrogen Production in the Nuclear Industry (2022/6/6) • Xcel Energy and Bloom Energy to Produce Zero-Carbon Hydrogen at Nuclear Facility (2022/9/19)
Marine Application Solid Oxide Fuel Cells	• Obtained international maritime classification approval and U.S. Bureau of Shipping application verification • Chantiers de l'Atlantique, and MSC Chart a Course for Cruise Ships Powered by Clean Energy(2021/12/16)

Source: Bloom Energy Press Release, 2022

Hydrogen Clean Energy

Capacity Planning

- Vacuum furnace production equipment expansion plan to meet customer future requirements.
- Factory expansion plan, the original factory area is 4,298 m^2 and planning Ziqiang factory area is 5,884 m^2 .
- Adopted lean production method (Lean Production) and digital transformation MES system (Manufacturing execution system)
- Adopted automated welding, three sets of robotic arms

Hydrogen Clean Energy

2023 Outlook

Hydrogen generation and regen for Circular Economy

Solution	Product Development	Growth Momentum
Purification and recycle of industrial hydrogen exhaust	✓ Recycle：eliminating exhaust disposal and pressurized supply by 70% recovery rate to reduce carbon emission ✓ Payback of hardware around 2.5 years (carbon tax not counted in yet)	• Co-working with several metal customers to implement
Hydrogen generator by methanol reforming (30&5 m3/h)	✓ Replacing hydrogen cylinders by investing the equipment with payback in 0.5 to 1.2 years (due to utilization) ✓ Proven stability with extended durability and thermal cycle tests.	• Proactively promoting to all hydrogen users in industries
Weather balloons for weather stations	✓ Replacing helium with hydrogen that saving consuming cost by 90% and resolving helium shortage problem ✓ Further developing mobile hydrogen generation and charging equipment, to be implemented in 2023 and expansion	• 2000 or more weather stations around the world and can be contacted

- **2022 Business Results and 2023 Outlook**

Plate Heat Exchanger

Hydrogen Clean Energy

Immersion Liquid Cooling

Immersion Liquid Cooling

Cooling Methods Comparison

Considering a rack with 42x 1U servers with 4 CPU each and 500W per CPU heat load, the total cooling requirement is 84kW. The comparison table below assume 100kW cooling requirement.

Parameters	Air-cooled	Direct to chip	Immersion	Remarks
Cooling capacity	100kW	90kW (water-cooled) +10kW(air-cooled)	100kW	
Cooling medium	Air	PG mixture	Dielectric liquid	
Temperature	20-25°C	40-50°C	40-50°C	
Specific heat	1 kJ/kg°C	4.2 kJ/kg°C	1.1 kJ/kg°C	
Medium density	1 kg/m^3	1000 kg/m^3	1800 kg/m^3	
Required mass flow	20.0 kg/s	4.8 kg/s	18.2 kg/s	
Required volume flow rate for 100kW	1200000 LPM 15 fans are required per U	288 LPM	607 LPM	Direct to chip and immersion require relatively low flow rates
Computer Room cooling system	Fan/Heatsink Fan/Rear door heat exchanger	Cold plate/Manifolds/CDU (90%) Fan/Heatsink (10%)	Immersion Heat Sink Tank/CDU	
Facility cooling system	Chiller plant	Cooling tower (90%) Chiller plant (10%)	Cooling tower	Chiller plants operate with high power consumption compressors
Piping networks	Hot/Cold Aisle	Water pipe	Coolant pipe	Liquid pipes are smaller than typical air duct and flow management are not required Low noise operation without fans

Data source：Kaori Heat Treatment Co., Ltd. Energy Management Department

Immersion Liquid Cooling

2023 Outlook

Year	Key of Development
Y2021	• A server component manufacturer has started product durability verification
Y2022	• Server verification, **with Fluorinert** performance and durability verification • Immersion liquid cooling standard product development and CE&UL certification
Y2023	• Server verification, **with insulating oil** performance and durability verification • Immersion liquid cooling standard product development, CE&UL certification and mass production

Immersion Liquid Cooling

Product Roadmap

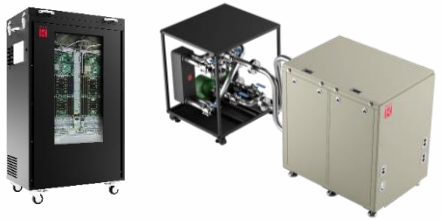
Server Liquid Cooling Market

Y2022 Q4 | Y2023 Q1 | Q2 | Q3 | Q4

In-Rack CDU

4U80kW CDU
- with water cooling plate
- with standard products of server manufacturers

Immersion Tank & CDU



- Edge Computing(2U/4U)
- Hyperscale Data Cent
- Containerized Data Center

2U Tank & 3kW CDU (Fluorinert) / **4U Tank & 7kW CDU** (Fluorinert)

2U Tank & 3kW CDU (Insulating oil) / **4U Tank & 7kW CDU** (Insulating oil)

10U Tank & 18kW CDU (Fluorinert)

25U Tank &100kW CDU (Insulating oil)

42U Tank &100kW CDU (Fluorinert)

2023 Operation Perspective ....

- Cross-Strait resource integration coordination and control, promotes effective scheduling of production, supply chain, market, costs, and improves the Group's operational performance.
- Deepen supply chain management: diversify supplier sources, increase localization ratio, promote sustainable assessment and governance, and assist in carbon reduction.
- Perform R&D momentum: Based on our core technology , develop new technology application fields and incubate low-carbon green energy solutions.
- Optimize the company's organizational structure, improve management efficiency and team execution.
- Key talent recruitment and core manpower training plan.
- Implement ESG sustainable promotion, and commit to carbon reduction actions in manufacturing process and operation.

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THANK YOU

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Reference: 3Q22 Financial Results

Unit：NT$ in thousands，EPS：NT$

Items	Y2018	Y2019	Y2020	Y2021	Y2022 Q1-Q3
Revenue	1,931,586	2,083,280	2,076,359	2,231,273	1,944,140
Gross Profit	566,945	575,456	528,382	593,603	528,394
Net Income before Tax	283,852	199,080	154,671	195,520	260,693
Net Income after Tax	229,734	158,138	112,524	149,156	200,564
EPS	2.57	1.77	1.26	1.67	2.24

Reference: 3Q22 Financial Results

Unit：NT$ in thousands，EPS：NT$

Items	Y2022.Q3	Y2022.Q2	QoQ	Y2021.Q3	YoY
Revenue	761,206	648,223	17.43%	557,942	36.43%
Gross Profit	204,567	174,436	17.27%	159,639	28.14%
Net Income before Tax	118,971	78,502	51.55%	61,402	93.76%
Net Income after Tax	92,284	61,709	49.55%	46,795	97.21%
EPS	1.03	0.69	49.28%	0.52	98.08%

Reference: 3Q22 Financial Results

Financial Ratio

Unit：NT$ in thousands，EPS：NT$

Items	Y2018	Y2019	Y2020	Y2021	Y2022 Q1-Q3
Current Ratio (%)	224	181	164	142	137
Quick Ratio(%)	134	110	101	85	60
Average Collection Days	67	48	60	61	56
Average Inventory Turnover Days	152	148	148	143	167
Debt Ratio(%)	32.77	34.28	44.70	44.76	49.38
Return on Total Stockholders' Equity (%)	12.63	8.61	6.01	7.84	13.90
Net Income to sales(%)	11.89	7.59	5.42	6.68	10.32