

# Jera

Energy for a New Era

# Briefing Materials for the Regular Press Conference

29 November 2023  
JERA Co., Inc.

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# 1. Measures to Address the Heavy-Load Winter Season for FY2023

# 1. Measures to Address the Heavy-Load Winter Season for FY2023

## Supply and demand outlook for the FY2023 winter season

- Although this winter's reserve margin is projected to exceed 3%, the minimum necessary to ensure stable supply, **JERA is taking nothing for granted and will make every effort to ensure a stable supply through measures to secure both kW and kWh.**

Reserve margin for January to February 2024

	Chubu Area		Tokyo Area	
	Jan	Feb	Jan	Feb
Mar.	9.4%	8.9%	4.6%	4.9%
↓				
31 Oct.	6.7%	6.6%	5.2%	5.7%

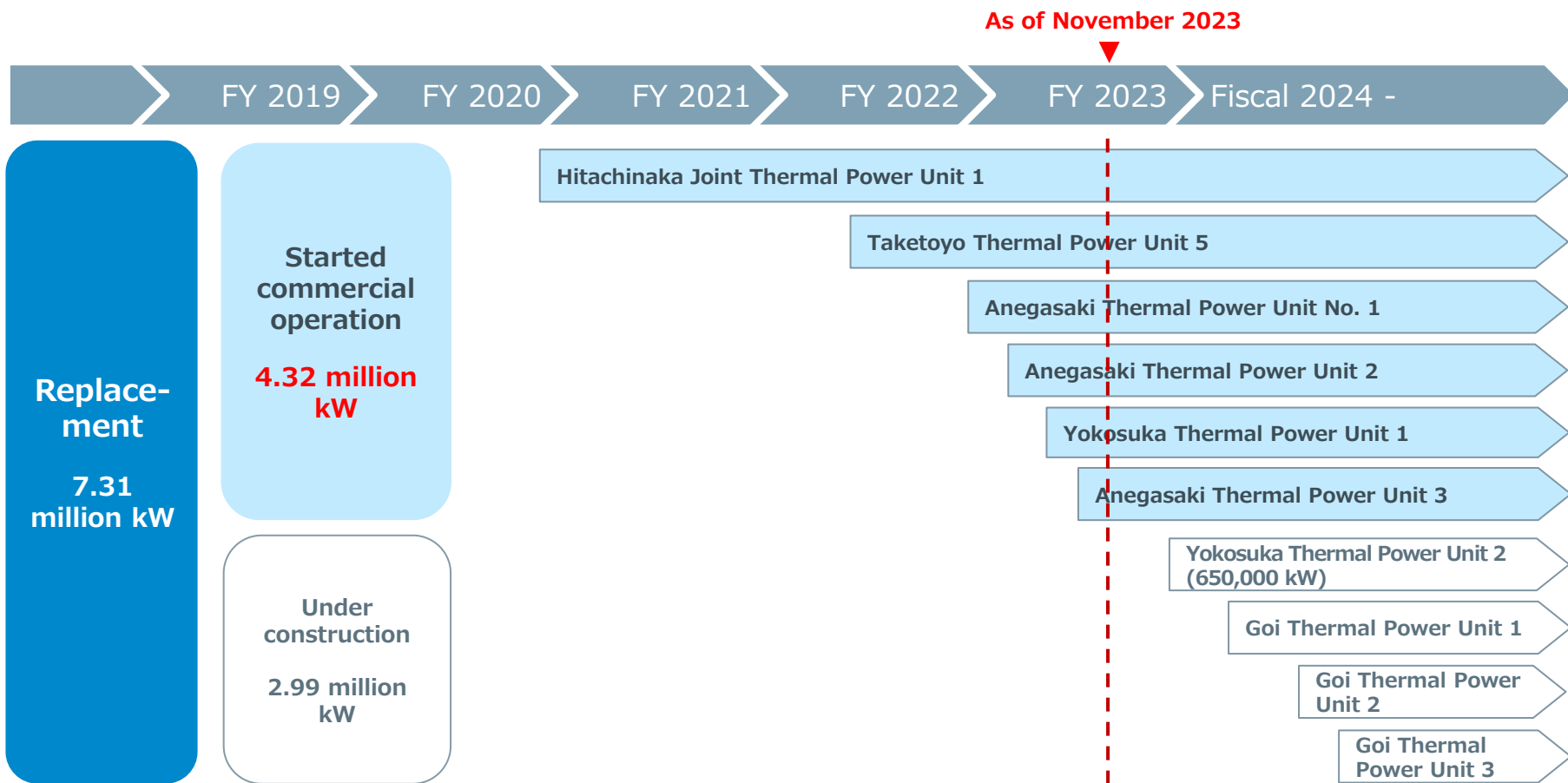
Sources:

Upper table: Document 5, 84th meeting of the Committee on Adjustment Capability and Supply-Demand Balance Evaluation

Lower table: Document 3, 66th meeting of the Basic Policy Subcommittee on Electricity and Gas, Advisory Committee for Natural Resources and Energy

## Efforts to secure kW

- Replacement with state-of-the-art thermal power generation facilities is progressing, and 6 units (totaling 4.32 million kW) have already begun commercial operations. By securing new supply capacity, JERA contributes to ensuring a stable supply of energy.



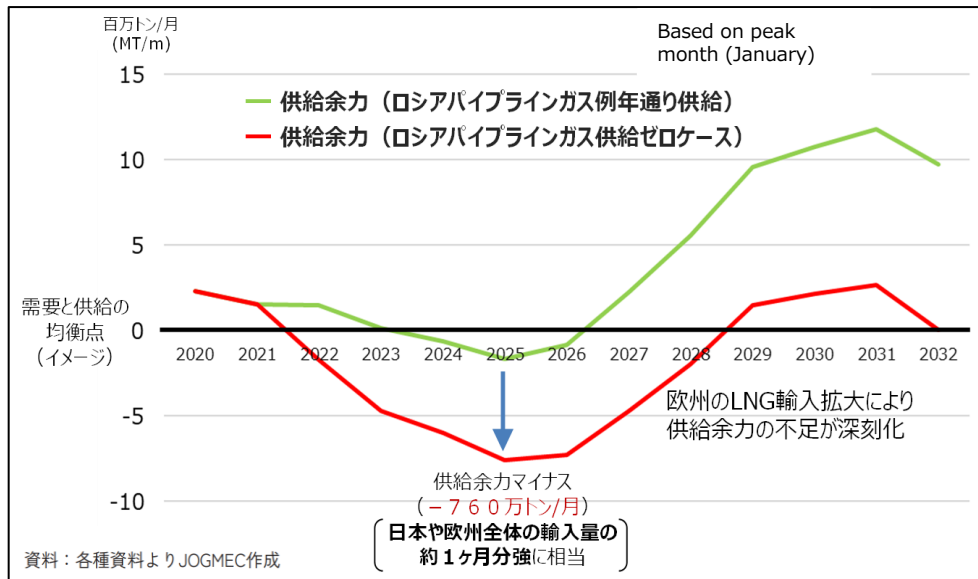
## Efforts to secure kWh (fuel): 1) LNG procurement environment

- Despite the forecast for a warmer-than-usual winter and the expected delay in restarting China’s economy, the **winter FY 2023 procurement environment is unpredictable due to factors such as rising concern about energy security and poor LNG production in various countries.**
- **Supply of LNG is not expected to catch up with demand until around 2025,** so a tight supply and demand situation is expected for LNG .
- Ensure stable procurement by **flexibly optimizing procurement and resale through JERA Global Markets**

### Procurement Environment for Winter FY 2023

Conditions this winter	<ul style="list-style-type: none"> <li>• Warm winter forecast</li> <li>• Trend toward high LNG inventory in Europe</li> <li>• Delay in China's economic recovery</li> </ul>
Uncertain factors	<ul style="list-style-type: none"> <li>• <b>Russia's invasion of Ukraine raises energy security concerns in each country</b></li> <li>• <b>Sluggish LNG production</b></li> </ul>

### Global LNG Supply Capacity



Source: Ministry of Economy, Trade, and Industry White Paper on Energy 2023 (Figure 121-3 -7)

# 1. Measures to Address the Heavy-Load Winter Season for FY2023

## Efforts to Ensure KWh (Fuel): 2) Start of SBL operation

- Operation of the **Strategic Buffer LNG (SBL)** framework begins this winter. **Having been approved as an authorized supplier of SBL, JERA will secure roughly one cargo of SBL per month from December to February.**
- **By supplying SBL under this framework in accordance with requests from METI, JERA will contribute to the stable supply of energy throughout Japan this winter.**

### 「戦略的余剰LNG (SBL)」の確保

- 石油のように長期間タンクに置いた備蓄が困難というLNGの性質を踏まえ、民間企業の調達力を活かす形で、**有事に備えたLNG確保の仕組み（「戦略的余剰LNG：SBL（Strategic Buffer LNG）」）**を用意し、供給途絶を防ぐ。
- **経済安全保障推進法**に基づいて、**SBL確保・運用の目標等**を経産省の**取組方針として提示**。取組方針に則って、事業者のSBL確保支援を実施する。

#### ■ SBL確保支援事業 概要

- ①：経産省が、JOGMECを安定供給確保支援独立行政法人に指定の上、基金を設置
- ①：事業者が中期・長期契約等に基づき、「戦略的余剰LNG (SBL)」を確保
- ②：**通常時**は、**国内事業者や海外マーケットに販売**
- ③：需給ひっ迫等が生じ、**経産省が必要と認める時**には、**経産省が指定した国内事業者へ販売**
- ④：②・③の販売に伴い、認定供給確保事業者**に転売損等が生じた場合**は、JOGMECは基金から**助成金を交付**
- ⑤：②・③の販売に伴い、認定供給確保事業者**に利益が生じた場合**は、事業者は基金へ**利益を返還**

#### 【事業イメージ】



Source: Document 3, 19th meeting of Petroleum and Natural Gas Subcommittee (5 December 2022), Ministry of Economy, Trade, and Industry

## 2. Progress in Achieving JERA Zero CO<sub>2</sub> Emissions 2050



## Progress in demonstrating 20% fuel substitution with ammonia

- Demonstration testing of 20% substitution with ammonia at Hekinan Thermal Power Station Unit 4 is **progressing steadily toward a start during FY 2023** (about a year ahead of the start date initially announced).

### Progress with IHI toward 20% substitution with ammonia



\*NEDO demonstration project

	2022		2023		2024	
	H1	H2	H1	H2	H1	H2
Ammonia facility	Provisional power receiving		Power receiving	Ammonia acceptance		
Burner installation			Demonstration test		Demonstration test completed	



Progress of equipment construction

### Safety measures and communication with local communities

Implement thorough safety measures and communicate with local communities to gain their confidence and understanding.



Early detection and treatment: 24-hour monitoring, patrol inspections, etc.



Prevention: Designed for safety (earthquakes, tsunamis, storm surges, etc.)  
Mitigation: Liquid-proof levee, emergency shut-off valve, etc.

Examples of safety measures



Safety measures brochure



## 2. Progress in Achieving of JERA Zero CO<sub>2</sub> Emissions 2050

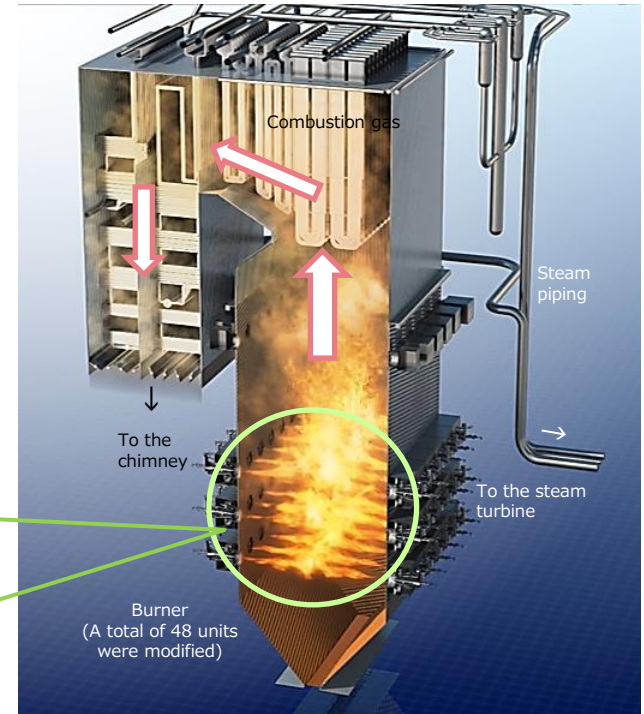
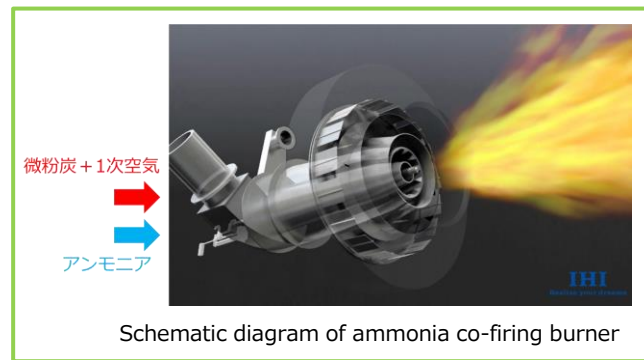
### Progress 50%+ substitution with ammonia: 1) IHI

- Based on a GI Fund project \*, IHI is developing burners for 50%+ substitution with ammonia.
- Development for small-scale furnaces has been completed, and large-scale furnace tests are underway, with **performance evaluation of combustion characteristics and other factors moving smoothly toward demonstration using an actual furnace.**



	2021	2022	2023	2024~2028
Small-scale furnace tests	▶			
Large-scale furnace tests		▶		
Practical demonstration tests				▶

Schedule for demonstration tests using actual equipment



Power generation boiler

## 2. Progress in Achieving of JERA Zero CO<sub>2</sub> Emissions 2050

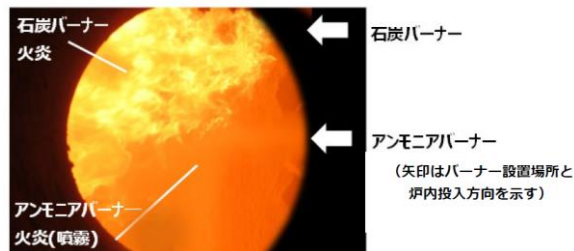
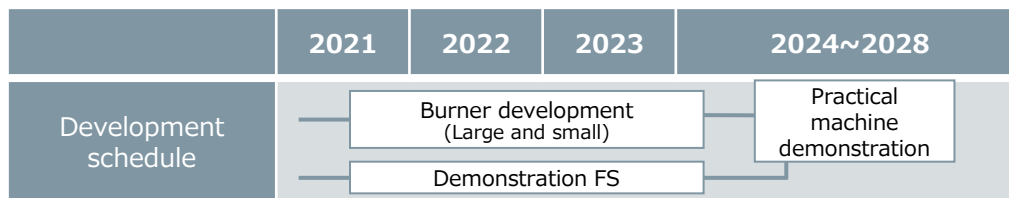
### Progress on 50%+ substitution with ammonia: 2) MHI

- Based on a GI Fund project\*, MHI is developing burners for 50%+ substitution.
  - ✓ In the combustion test furnace at 0.5 t/h, combustion was stable for both the 50%+ substitution with ammonia test and the exclusive combustion test. In addition, **emissions of NOx were confirmed to be lower than for coal-only combustion, and complete combustion of ammonia was confirmed.**
  - ✓ Going forward, combustion tests will be conducted using a full-scale 4t/h combustion test furnace with a full-scale burner.
- After burner development is complete, **the next step will be to shift to demonstration testing on actual equipment aimed at establishing the technology for commercial operation.**

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**MITSUBISHI**  
**HEAVY INDUSTRIES**



Flame situation when co-firing ammonia and coal

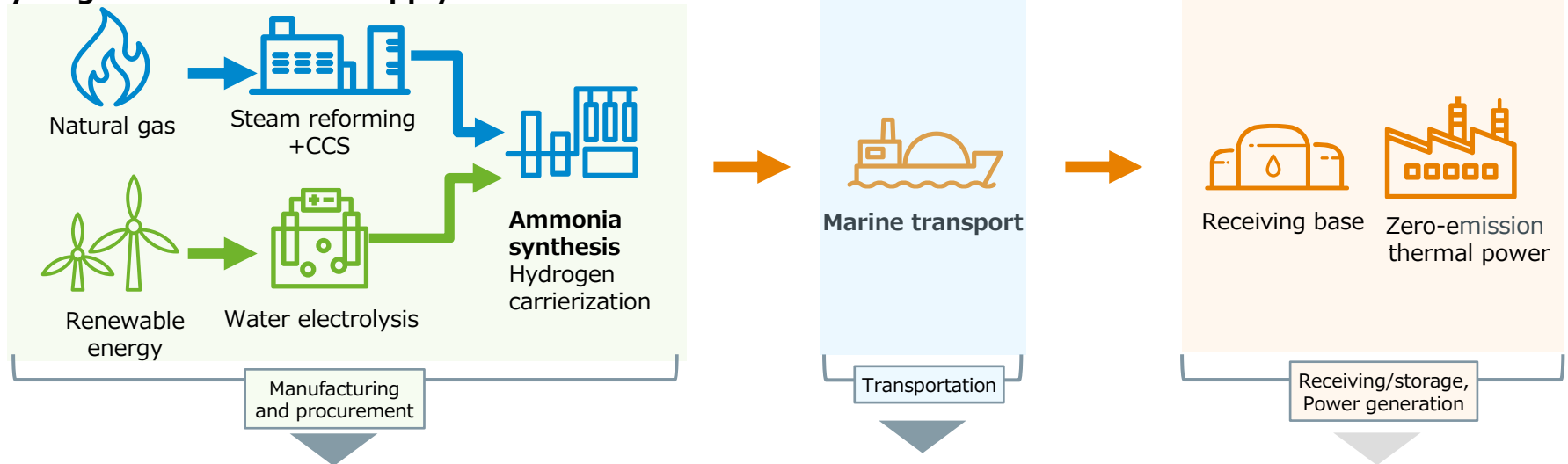


Ammonia combustion test facility (0.5 ton/h combustion test furnace)  
Source: MHI Press Release (<https://www.mhi.com/news/23112801.html>)

# Construction and expansion of the hydrogen and ammonia supply chain

- Production and procurement: We are considering collaborations with Yara and CF Industries related to **developing large-scale production of blue ammonia** and **procuring fuel ammonia for Hekinon Thermal Power Station Unit 4**. Aiming to expand the use of ammonia going forward, we are moving forward to cooperate with many companies.
- Transportation: We are considering collaborations with NYK and MOL to **establish methods for transporting fuel ammonia, including the development of large-volume ammonia carriers**.

Hydrogen and ammonia supply chain



Consider Collaborating on Manufacturing and Procurement



Consider Collaborating on Transportation



Collaboration on Power Generation Demonstration





## 2. Progress in Achieving of JERA Zero CO<sub>2</sub> Emissions 2050

### Working with Toyota to build a large-scale energy storage system using reclaimed batteries

- Technological development is proceeding as we aim, in collaboration with Toyota Motor Corporation, to establish operation of a large-scale energy storage system that can effectively utilize reclaimed electric vehicle drive batteries that vary widely in performance and capacity.
- We have filed patent applications in Japan and overseas, and are considering global business development.

Jera × TOYOTA

カーボンニュートラル

サーキュラーエコミー

火力の最適化



電動車



新品



資源不足・  
価格変動



電力

安定供給に貢献

大規模リユース  
蓄電システム

資源 ※※

ムダなく使う

スweep技術※で活かす

中古



リサイクル材確保



供給力変動



Demonstration test  
(Yokkaichi Thermal Power Plant)

External appearance of the energy storage system



Internal view of the energy storage system



Equipment scale 485 kW/1,260kWh  
(Equivalent to Daily Use by Approximately 145 General Households)

FY 2018 to FY 2019  
Small-scale demonstration  
(nickel-metal hydride)

FY 2020  
Small-scale demonstration  
(lithium ion)

FY 2021  
Small-scale hybrid  
demonstration  
(nickel-metal hydride + lithium  
ion)


FY 2022  
Hybrid Operation  
High-voltage interconnection  
(24<sup>th</sup> Jan)

FY 2023 -  
Hybrid operation  
Special high voltage  
interconnection (planned)



### Building clean energy supply bases in Asia

- In order to achieve both **decarbonization** and a **stable supply of energy** that will support **vigorous economic development in Asia**, we are helping to draw up decarbonization road maps that fit the actual conditions in each country.


#### Bangladesh

- Cooperated with Summit Power in developing a decarbonization roadmap (April 2022) 


#### Thailand

- Concluded an MOU with EGCO related to cooperation in the energy transition field (April 2022)
- Joint study with EGCO related to ammonia use (January 2023) 
- Joint study with PTT related to building a hydrogen and ammonia supply chain (May 2023) 

#### Malaysia

- Collaboration with IHI Asia Pacific on the expansion of ammonia usage in Malaysia (October 2022) 

#### Philippines


- Investment in Aboitiz Power to promote clean and renewable energy (September 2021)
- Start of joint study on ammonia co-firing at Aboitiz Power's coal-fired power plant (February 2023) 

#### Vietnam

- Cooperate with Vietnam Electricity in drawing up a decarbonization roadmap (October 2023) 



#### Indonesia

- Launch of a joint study related to carbon capture and storage (CCS) projects at thermal power plants with JGC Holdings and the Indonesian state electricity company (PLN) (October 2023)  
- Study and support for drawing up a power sector decarbonization roadmap for the Republic of Indonesia (November 2021)

#### Singapore

- Jurong Port, Mitsubishi Heavy Industries Asia Pacific, and JERA Asia came together to explore establishing a gas turbine power plant fuelled only by ammonia. (August 2022)

### OM collaboration with Aboitiz Power

- A human resources exchange program with Aboitiz Power in the Philippines began in July this year as an **operations and maintenance collaboration aimed at elevating the technical capability of both companies.**

We sent three employees to an Aboitiz Power plant, providing know-how



One of our employees (at left) provides technical support at Aboitiz Power's GMEC power plant



Collaboration in OM  
(Human Resources Exchange)

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We accepted three engineers from Aboitiz Power at Hekinan Thermal Power Station, where we provide learning opportunities.



Employees of Aboitiz Power Company (the three at right) visit our training facility and are briefed by staff

### 3. New Value Creation Through the Power of Imaginative Innovation



## Adopting Femtech

- By adopting Femtech\*<sup>1</sup> and **providing diverse solutions to women's health issues**, we will work to **create an environment in which all employees, regardless of gender, can realize their full potential.**

### Investment in Femtech venture fund

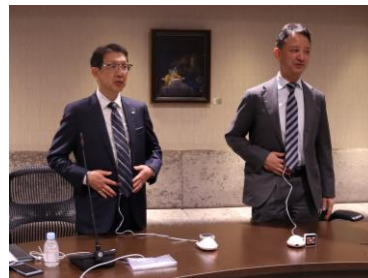
Through JERA Ventures, we invested in the Nextblue II fund, Asia's first venture fund specializing in Femtech, as a solution to issues related to employee health, happiness, and ease of work.



NEXTBLUE

### Holding workshops for senior management

A workshop was held for senior management to deepen their understanding of women's health issues by wearing a menstrual cramp simulator (Perionoid\*<sup>2</sup>) (27 Nov.)



View during the experience

### Reference: Overview of JERA Ventures

Items	Contents
Overview/ Purpose	<ul style="list-style-type: none"> <li>•JERA in-house organization leading corporate venture capital activities.</li> <li>•To be a good partner for start-up companies that are taking on the challenge of changing the world in the energy domain.</li> </ul>
Start of activities	July 2023
Investment amount (Investment period)	300 million USD (2023 to 2030)
Investment areas	<ul style="list-style-type: none"> <li>•Decarbonization</li> <li>•Creation of digital solutions</li> <li>•Improvement of employee ease of work</li> </ul>
Key concept	A sandbox for people who are serious about changing the world

\*1 A neologism combining "female" and "technology" that refers to products and services that address women's health issues.

\*2 Developed by Osaka Heat Cool Co., Ltd.

## Collaboration with the University of Tokyo's Research Center for Advanced Science and Technology

- In collaboration with the University of Tokyo's Research Center for Advanced Science and Technology, we established the Youth Koyasan Conference as a place to practice STEAM education\*.

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東京大学 先端科学技術研究センター  
Research Center for Advanced Science and Technology  
The University of Tokyo

### Youth Koyasan Conference

- Designed for high school and university students, this is a spin-off project of the Koyasan Conference, a scientific and cultural conference organized by the University of Tokyo's Research Center for Advanced Science and Technology.
- By providing a variety of learning and experiential opportunities, the project aims to nurture human resources who can think for themselves and exercise self-discipline.

#### Topics

On 26 December, the University of Tokyo's Research Center for Advanced Science and Technology will hold "Crosstalk," a discussion project on cross-disciplinary integration. President and COO Okuda is scheduled to take the stage from our company.



**Koyasan Conference  
Program (example)**

\*STEAM Education: Science, Technology, Engineering, Arts and Liberal Arts, Mathematics—an educational philosophy that combines science and mathematics education with creativity education.