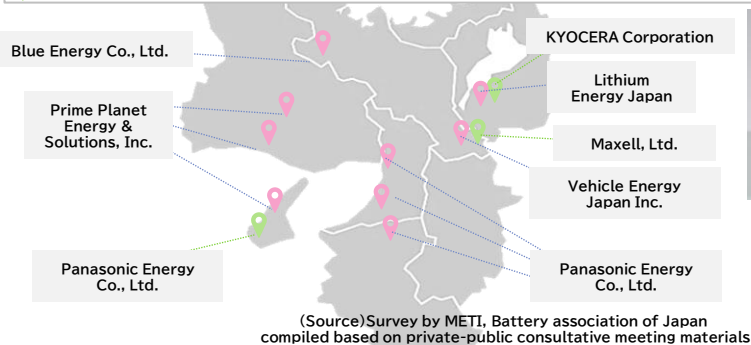


# 4-1 Green Innovation(Storage Batteries)

- Kansai is a major base for development and production in storage battery industries such as lithium-ion batteries and Redox Flow Batteries using vanadium.
- The industrial cluster consists not only of battery manufacturers but also of related component/material and device manufacturers, all working on the development and production of next-generation batteries.

Many lithium-ion battery production bases are located in Kansai!

- 📍 Automotive (and consumer/industrial, etc.) Lithium-ion battery production base
- 📍 Consumer/Industrial Lithium-ion battery production base



**Panasonic**



A production facility for new automotive lithium-ion batteries(4680) will be installed at the Wakayama Plant, with mass production scheduled to begin in FY2023.

**SUMITOMO ELECTRIC**



Long-life, High-safety Storage Battery “Redox Flow Battery”

The company develops and manufactures Redox Flow Battery, which stabilize the power grid, achieve load leveling through power peak shifting, and enhance power resilience, all of which are necessary to expand the introduction of renewable energy.

## Evaluation and testing facility supporting materials development

**nite** the National Institute of Technology and Evaluation(NITE)  
<https://www.nite.go.jp/gcet/nlab/pamphlet.html>



National LABORatory for advanced energy storage technologies

World 's Largest Thermostatic "Large Storage Battery System Test and Evaluation" Facility  
 Compatible with container-sized storage battery systems

The NLAB (storage battery evaluation center), located in Suminoe-ku, Osaka, can safely handle combustion, explosion, and toxic gases generated during the testing of lithium-ion batteries, allowing the testing and evaluation of large storage battery systems to be conducted in NLAB's indoor type testing facility, regardless of weather conditions. Various other functional tests such as vibration, nail penetration, and drop tests are also available. Further expansion of the testing facility is planned for this fiscal year and beyond.

Consortium for Lithium-Ion Battery Technology and Evaluation Center (LIBTEC)



▲Equipped with prototype and evaluation equipment

To assist companies in developing new materials for lithium-ion batteries, the consortium creates standard battery models in line with battery market trends, creates material evaluation methods, and performs evaluation analysis. Thirty-five companies, including battery manufacturers, material chemical companies, and automotive companies, are involved as members.



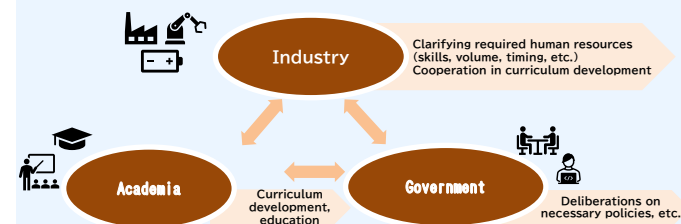
LIBTEC Director-General Dr. Yoshino Akira

- 2019 Nobel Laureate in Chemistry
- Graduated from the Graduate Schools of Engineering at Kyoto University and Osaka University
- Honorary Fellow, Asahi Kasei Corporation

## “Kansai Storage Battery Human Resource Development Consortium” established

The Kansai region is home to a cluster of production bases, including many manufacturers of storage batteries and manufacturing equipment as well as suppliers of components, backed by the technology cultivated in traditional industries such as textiles and pharmaceuticals. Kansai has an approximately 36% share of manufactured goods shipments in the storage battery manufacturing industry in Japan. In addition, there is a favorable environment for R&D at universities, LIBTEC, NITE, and AIST.

Together with the Battery Association of Japan (BAJ) and the Battery Association for Supply Chain (BASC), the Kansai Bureau of Economy, Trade and Industry has established the “Kansai Storage Battery Human Resource Development Consortium,” comprising industry, academia and government, with the aim of developing and securing human resources that meet industry needs and achieving the storage battery industry strategy. Discussions and deliberations are underway on measures that should be taken.



## 4-2 Green Innovation (Hydrogen/Fuel Cells)

- Kansai is home to many manufacturing companies, including heavy industries in port areas, and has high potential for the demand and supply of hydrogen and fuel cells.
- Various companies in Kansai are developing technologies in the hydrogen field by utilizing their core technologies and are leading the country in many hydrogen-related demonstration projects.

### Potential for hydrogen in Kansai

Potential for hydrogen demand	Population and industry concentration
	Diverse and abundant cultural and tourism resources
	High awareness of disaster risk reduction due to the experience of the Great Hanshin-Awaji Earthquake
Potential for hydrogen supply	Promotion of renewable energy introduction
	Presence of Strategic International Ports and Central International Ports

(Source) "KANSAI Hydrogen Primer," Kansai Bureau of Economy, Trade and Industry

### Major companies related to hydrogen and fuel cells in Kansai

 Iwatani Corporation	 Panasonic Corporation
 Kawasaki Heavy Industries, Ltd.	 Kyocera Corporation
 Air Water Inc.	 Hitachi Zosen Corporation

### International liquefied hydrogen supply chain

The CO<sub>2</sub>-free Hydrogen Energy Supply-chain Technology Research Association (HySTRA), consisting of companies such as Kawasaki Heavy Industries, Ltd. and Iwatani Corporation, has successfully conducted a technology demonstration using the world's first liquefied hydrogen carrier "Suiso Frontier" to transport liquefied hydrogen, including that derived from brown coal, from Australia to Japan, and unload it at the liquefied hydrogen cargo handling terminal "Hy touch Kobe" (Kobe City). Following this technology demonstration, a group of companies including Iwatani Corporation and ENEOS Corporation, led by Japan Hydrogen Energy Co., Ltd. established by Kawasaki Heavy Industries, Ltd., will receive funding from the Green Innovation Fund to conduct a commercialization demonstration to realize large-scale hydrogen importation.



### Current projects for public implementation of hydrogen in various parts of Kansai

- Decarbonization of thermal power generation facilities through the development of hydrogen gas turbine power generation technology

#### ○Mitsubishi Heavy Industries, Ltd.

MHI has developed combustors that can stably co-fire 30% hydrogen in large-frame highly efficient gas turbines. By FY2025, the technologies will be verified at the power generation validation facility at MHI's Takasago Machinery Works, and then, plan to be commercialized. The technologies will enable existing power plants to generate electricity by hydrogen fuel by replacing the combustors of the gas turbines and minimize costs for modification. By converting a large amount of natural gas to hydrogen in large-frame gas turbines, hydrogen production costs are expected to be reduced through economies of scale by stimulating a large amount of hydrogen demand in energy market.



- Demonstration of a hydrogen supply chain model using the "H2One™ Multi Station"

#### ○Tsuruga City, Fukui Prefecture × Toshiba Energy Systems & Solutions Corporation

Demonstration of a hydrogen supply chain model using the "H2One™ Multi Station," Japan's first on-site renewable energy hydrogen infrastructure system, was conducted in Tsuruga City. The system uses green hydrogen derived from renewable energy sources to refuel cell vehicles, charge electric vehicles, and supply electricity and hot water for evacuation centers during disasters. It contributes to a carbon-neutral society as an infrastructure that produces green hydrogen from renewable energy and water on site, and realizes a hydrogen supply chain that is locally produced for local consumption.



- Demonstration test of a fuel cell system for ships

#### ○Yanmar Power Technology Co., Ltd.

The world's first 70 MPa high-pressure hydrogen refueling was performed on a demonstration test boat equipped with a fuel cell system. In 2021, an operational test was conducted on a route connecting the planned site of Expo 2025 Osaka, Kansai and the city's coastal area. Sales of the fuel cell system for ships are planned for 2023.



- Data collection of hydrogen-related companies in Kansai

( PDF )



[https://www.kansai.meti.go.jp/5-1shiene/smart\\_energy\\_initiative/hydrogen\\_data/00\\_zentai\\_english.pdf](https://www.kansai.meti.go.jp/5-1shiene/smart_energy_initiative/hydrogen_data/00_zentai_english.pdf)



## 4-3 Life Science Innovation

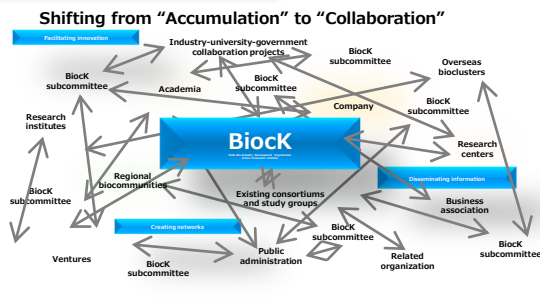
- The Biocommunity Kansai (Biock), based in Kansai, was certified as a Global Biocommunity by the Cabinet Office in April 2022.
- Since Kansai has long been a center of medicine, it is home to many pharmaceutical company headquarters, foreign-affiliated companies, and medical equipment manufacturers closely working with each other.
- Research in regenerative medicine, disease elucidation, and drug discovery is being conducted on a daily basis, including the creation of the world's first therapeutic agent through clinical research applying iPS cell technology.

### About Biocommunity Kansai



<b>Vision</b>	Spreading a bio-first approach to build a Global Biocommunity and realize a sustainable society
<b>Goal</b>	Creating an ultimate ecosystem for the bio-fields in Kansai
<b>Key word</b>	Shifting from "Accumulation" to "Collaboration"

<b>Name Abbreviation:</b>	✓ Biocommunity Kansai ✓ Biock
<b>Foundation</b>	✓ July 1st, 2021 ✓ Certified as a Global Biocommunity by the Cabinet Office on April 22, 2022
<b>Action plan</b>	✓ Facilitating innovation ✓ Creating networks ✓ Disseminating information
<b>How the community should be</b>	✓ Making a community focusing on industry ✓ Strengthening collaboration across all of the biocommunity ✓ Leading new innovation



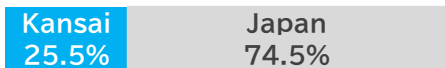
(Source) Biock HP "Biock Summary Documentation"

#### Share of production value in quasi-drug industry



(Source) "Statistics of Production by Pharmaceutical Industry" Ministry of Health, Labour and Welfare (FY2020) production of quasi-drugs, import, shipment, and inventory value by region

#### Share of products manufactured and shipped in the pharmaceutical industry



(Source) "Census of Manufacture Area Statistics Table" Ministry of Economy, Trade and Industry (FY2020)

#### Kansai Life Science Cluster PR Booklet

This booklet introduces the Kansai region by integrating life science-related information held by each prefecture in Kansai!



(PDF) [https://www.kansai.meti.go.jp/3-1toukou/INVEST\\_support\\_eng/lifescience/2020lifescience.en.pdf](https://www.kansai.meti.go.jp/3-1toukou/INVEST_support_eng/lifescience/2020lifescience.en.pdf)

A large cluster of pharmaceutical company headquarters		Concentration of research and development bases and core institutions
Sumitomo Pharma	Sumitomo Pharma Co., Ltd.	Kansai Branch of Pharmaceuticals and Medical Devices Agency (PMDA)
SHIONOGI	Shionogi & Co., Ltd.	Kansai Branch of Japan Agency for Medical Research and Development (AMED)
KOBAYASHI	Mitsubishi Tanabe Pharma	Center for iPS Cell Research and Application, Kyoto University
Takeda	Takeda Pharmaceutical Company Limited	[Saito (International Culture Park)] <Life Science Park>
ONO	ONO PHARMACEUTICAL CO., LTD.	KOBE Biomedical Innovation Cluster
FUSO	FUSO Pharmaceutical Industries, Ltd.	RIKEN
Santen	Santen Pharmaceutical Co., Ltd.	Center for iPS Cell Research and Application, Kyoto University
Medical equipment manufacturers concentrated in this area		A large cluster of pharmaceutical company headquarters
NIPRO	NIPRO CORPORATION	AstraZeneca K.K.
OMRON	OMRON Corporation	Eli Lilly Japan K.K.
SHIMADZU	SHIMADZU CORPORATION	Bayer Yakuin, Ltd.
sysmex	SYSMEX CORPORATION	ICON plc

**Strengths in the life science field in Kansai ~ World-leading industry-academia accumulation ~**  
 With a large-scale accumulation of world-leading research institutes, universities, and companies in the field of life science, various clusters are within reach of the three cities of Kyoto, Osaka, and Kobe, within about 30 minutes to 1 hour of the large-scale accumulation of the Kansai region, making the whole Kansai area a large-scale life science cluster.