



# F-REI

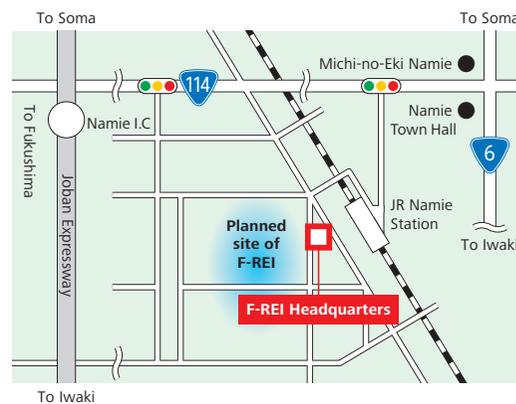
Fukushima Institute  
for Research, Education  
and Innovation

## Fukushima Institute for Research, Education and Innovation (F-REI)

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	<b>From Tokyo Station:</b> Three hours and 20 minutes by Joban Line Limited Express	
	<b>From Sendai Station:</b> One hour and 20 minutes by Joban Line Limited Express	
	<b>From Iwaki Station:</b> One hour by Local train	
	<b>From Fukushima Station:</b> One hour and 30 minutes by car	
	<b>From Koriyama Station:</b> One hour and 30 minutes by car	
	<b>From Fukushima Airport:</b> One hour and 30 minutes by car	

(Times are approximate.)



Website	X	Facebook	Newsletter Registration
			

\* Please note that our email newsletter as well as interactions on X and Facebook are only available in Japanese.





## A global beacon of hope and dream

F-REI believes that in the near future, the hopes and dreams shining through the post-disaster reconstruction of Fukushima and the entire Tohoku region can inspire hope and dream in people all over the world.

F-REI is based in Hamadori, Fukushima Prefecture, and conducts its activities there. In our future vision, F-REI is home to some of the world's most advanced research, conducted by researchers and entrepreneurs committed to driving innovation who have been drawn to Fukushima's unique R&D and demonstration possibilities.

Local forests and farmland are kept in prime condition by labor-saving robots and drones. Well-maintained forests can store abundant water which becomes the groundwater that eventually feeds rivers. Water from forests replenishes farmland for rich harvests of crops.

The results of F-REI's research generate not just new industries, but new growth industries by teaming up with well-established local businesses as well as ventures and entrepreneurs. This positive environment encourages yet more people to come and live in the local area, filling it with vitality and dynamism. A shining symbol of post-disaster reconstruction, Fukushima and the wider Tohoku region we envisage can inspire hope and aspiration in people all over the world.

Although there is still some way to go before we achieve such a vision, our journey toward this future has already begun, and will continue ceaselessly, focused on what lies beyond post-disaster reconstruction.

# F-REI

Fukushima Institute for Research, Education and Innovation



F-REI was established in April 2023 by the Government of Japan under the Act on Special Measures for the Reconstruction and Revitalization of Fukushima. Categorized as a special legal entity, F-REI is headquartered in Namie Town in Hamadori, Fukushima Prefecture. Through activities taking place across a wide geographical area in and around Hamadori, F-REI aims to create a setting for research, demonstration, and real-life implementation not found elsewhere in the world.

## Center of excellence for creative reconstruction

F-REI was created to inspire hope and dream toward rebuilding and revitalizing Fukushima as well as other parts of Tohoku. To address Fukushima’s challenges, pave the way for its reconstruction, and open up its possibilities for the future beyond, we need innovation that allows us to radically rethink how industry and society work—and its creation requires R&D

with a long-term vision.

F-REI creates a world-renowned research environment in which researchers can engage in cutting-edge R&D, making use of the results for the reconstruction of Fukushima and Tohoku. F-REI is also tasked with sharing the results widely, thereby ensuring that the benefits of Fukushima’s reconstruction have global reach and contribute to national growth by driving Japan’s scientific & technological capabilities, and industrial competitiveness to become among the world’s best.

## F-REI’s four functions

F-REI has four main functions. F-REI’s primary function is **research and development**. F-REI identifies research fields where Fukushima has an advantage, and conducts world-class R&D in these fields. F-REI’s second function is **Industrialization**. Through real-life implementation of research outcomes, F-REI creates innovation and new local industries. F-REI’s

third function is **human resource development**. F-REI’s projects encourage the early careers of researchers, and the expertise of corporate employees. F-REI also offer educational programs for children in the local community, designed to build capacity for future generations. F-REI’s fourth function is that of a “**control tower**” for creative reconstruction. F-REI horizontally links the various reconstruction activities of multiple bodies to propel them further.

(See pp. 7-8 for details.)

## F-REI’s five research areas

Experiencing an earthquake, tsunami, and nuclear accident in combination makes Fukushima not just unique in the world but also advantageously positioned for certain fields of research. F-REI identifies these to be 1) **robotics**; 2) **agriculture, forestry and fisheries**; 3) **energy**; 4) **radiation science, medicine and drug development, &**

**industrial applications for radiation**; and 5) **collection and dissemination of data and knowledge on nuclear disasters**, and aims to conduct international cutting-edge R&D in these areas.

(See pp. 9-10 for details.)

## Driving wider regional collaboration for wider-reaching benefits

Reconstruction efforts to date in Fukushima and Tohoku have been numerous and varied. F-REI works synergistically with existing programs such as the Fukushima Innovation Coast Framework and aims to further propel them by providing a horizontal link for wider collaboration that allows R&D outcomes to have greater ripple effects. Our aim is to nationally and internationally share the future that post-disaster reconstruction can create.

(See p. 13 for some of the institutes and facilities )



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F-REI, a place each of us can call our own



## Aiming to make F-REI the world's most progressive and open organization

Accepting the post of F-REI's first president was a serious decision for me. To dispel any reservations, I set aside plenty of time to visit and take a firsthand look at Hamadori in Fukushima, which revealed to me that there were discrepancies between the actual situation on the ground and the reconstruction as related by the media.

The prolonged evacuation of residents from the local area, for instance, has left communities with many, many challenges still requiring medium to long-term commitment, such as population decline, shortage of industry players, and vast tracts of unused land. Upon receiving my appointment letter from Prime Minister Kishida, I braced myself with a renewed sense of responsibility, as I realized that it was worth dedicating my entire life to this task.

Firmly establishing ourselves in Fukushima and the wider Tohoku region, we will enlist the participation of like-minded people who are curious about F-REI, whether they are from Japan or overseas, to conduct R&D at the highest global level. Our first step would be to build a solid research environment in the local area and conduct productive research. The results of the research can generate new local industries and build capacity in the community, allowing us to eventually see locally-born people pursuing active careers as researchers and research supporters—this is the kind of “hub” I want F-REI to become.

Instead of closing itself to the outside world, I want the F-REI grounds to be open to local residents, who may come to walk their dogs, or to visit for scientific experiment classes hosted for children. Also, F-REI researchers are encouraged to actively interact and engage with the local community by participating in community building and other activities. My hope is

for F-REI to grow into a place that brings rich color to the lives of people who meet there, and be a source of pride for each individual—a place each of us can call our own.

My personal wish is for Hamadori, Fukushima to one day become Japan's most desirable residential destination called “Joban region's California”, where people dream of relocating to in much the same way as people in the U.S. yearn of someday living on the West Coast.

“I am here today only because F-REI began when it did.” This is how I hope many people in the near future will be talking about our activities. I will fully commit myself to F-REI and its projects, steadily building achievements that can benefit Fukushima, Tohoku, and the whole population beyond. I look forward to your ongoing support and cooperation.



**YAMAZAKI Koetsu**

**President, Fukushima Institute for Research, Education and Innovation (F-REI)**

Born in Toyama Prefecture. Completed master's program at Kanazawa University Graduate School of Engineering (1976) and doctoral program in engineering at Osaka University (1982). Professor of Engineering, Kanazawa University as a researcher in strength of materials and design engineering (1994). After serving as Director and Vice President, assumed post of President of Kanazawa University (2014). Special Advisor to Kanazawa University and Special Advisor to the Reconstruction Agency (2022). Current President of F-REI (since 2023).

# F-REI's four functions

## 1 Research and Development

Offering the country's top-class research infrastructure to drive world-leading R&D

F-REI aims to conduct world-leading R&D in five research fields that can benefit from being conducted in Fukushima, a place unlike any other in that it has experienced an earthquake, tsunami, and nuclear accident. By creating one of the country's leading world-class research centers here, and making it a core center for creative reconstruction, we aim to drive research beneficial for solving local and global challenges, and for encouraging industry creation.

### F-REI's five research fields

Robotics
Agriculture, Forestry and Fisheries
Energy
Radiation Science, Medicine and Drug Development, & Industrial Applications for Radiation
Collection and Dissemination of Data and Knowledge on Nuclear Disasters



Conducted in accordance with our own R&D policies for respective fields, F-REI's R&D aims to contribute to solutions for society's issues and become sources of national and international pride.

## 2 Industrialization

Serving new industry creation with our R&D results

By making use of the conditions that Hamadori, Fukushima Prefecture offers to field test R&D results in and around that area, F-REI aims to put its R&D results to service in new industry creation as well as the reconstruction of Fukushima and Tohoku. R&D results will find industrializations in partnership with businesses, universities, and other organizations, and in coordination with the industrialization measures of national and local governments.

### Actions for industrialization

Establishing a business-academia partnership system that allows joint research with businesses
Conducting demonstration and real-life implementation capitalizing on wide area fields
Putting in place a strategically sound intellectual property management policy
Hosting seminars and other programs for networking with businesses, researchers, and other potential collaborators
Identifying the local community's potential and needs by creating opportunities for conversations with local governments



Through real-life implementation of R&D results, F-REI aims to create innovation and new growth industries

## 3 Human resource development

Working with the community, schools, and businesses to cultivate talent for serving future generations

F-REI is rooted in the community and committed to making positive contributions to a future that lies beyond reconstruction. We conduct talent cultivation for the next generation—young people and children in the community. Further, we aim to drive effective talent cultivation through training programs offered in partnership with graduate schools, universities, and colleges of technology. These include highly unique scientific experiment classes, seminars for elementary and middle school children, and long-term training for the research technicians who are essential to research work.

### Actions for human resource development

Utilizing F-REI's cutting-edge R&D capabilities to offer research guidance to graduate students
Offering hands-on training designed to give local high school students, technical college students, and university students an experience with state-of-the-art R&D
Conducting educational programs for the future generation, such as science education and school visits for elementary and middle school children
Offering skills training and recurrent education for corporate employees and professionals



F-REI aims to establish mechanisms within the local community that encourage early-career F-REI researchers to adopt leading roles in R&D, industry, and long-term reconstruction.

## 4 Control tower

Boosting the drive and ripple effects of reconstruction efforts by linking the activities of multiple organizations

While working in synergy with existing reconstruction efforts in Fukushima and the wider Tohoku region, F-REI also serves the role of driving collaboration across different bodies to propel their activities further. The R&D Council for New Industry Creation (F-REI Council) was formed and is operated by F-REI to ensure its services have wider ripple effects.

### Main functions as a control tower

Organizing and running the F-REI Council
Driving collaboration with universities, colleges of technology, local governments and businesses
Optimizing R&D activities across organizations by streamlining and integrating facilities
Coordinating and driving collaboration between existing bodies in Fukushima Prefecture

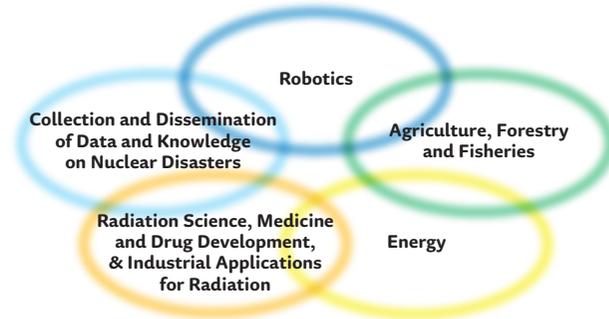


By collaborating across different organizations, F-REI aims to maximize the effectiveness of its R&D, industrializations, and human resource development, thereby further propelling reconstruction and broadening the reach of its benefits.



## F-REI's five research areas

As a core center for reconstruction, F-REI drives world-leading R&D in five research fields that can benefit from being conducted in Fukushima. Research results are combined and made to interact across the fields for further development.



### 1 Robotics

#### Developing robots and drones for harsh environments

In Fukushima—a place that has suffered both a natural disaster and the resulting nuclear accident—F-REI conducts R&D on robots and drones that are useful under harsh environmental conditions, such as those presented by natural disasters and nuclear decommissioning. We are aiming to develop clean, advanced hydrogen-powered drones and autonomous robots with mobility and resistance to radiation, water, and heat, in order to perform tasks in places that are hazardous to humans.



### 2 Agriculture, Forestry and Fisheries

#### Breathing new life into forests and farmland to revitalize both nature and industry

Post-disaster Fukushima has been left with vast tracts of unused farmland and neglected forests. F-REI aims to contribute to a sustainable and mutually beneficial relationship between nature and the economy by establishing high-profit, large-scale agricultural production models employing solutions such as robots for “smart” or fully automated agriculture, forestry and fisheries operations, and the use of woody biomass as an energy source and new material.



### 3 Energy

#### Growing a sustainable community by achieving carbon neutrality locally

F-REI aims to make Fukushima a pioneering carbon-neutral destination. To this end, we conduct a wide range of research and development activities, with a focus on renewable energy and covering topics such as the storage, transport and use of hydrogen energy. We also drive technology into the real world by carrying out the risk assessments and studies needed to set technical standards. Other energy-related R&D topics include carbon capture and fixation using plants and seaweed, and solutions for building hydrogen-powered “smart” communities.



### 4 Radiation Science, Medicine and Drug Development, & Industrial Applications for Radiation

#### Utilizing radiation science for state-of-the-art cancer treatment, agriculture, and industrial manufacturing

F-REI views radiation science as fundamental to research serving the creative reconstruction of communities suffering the effects of a complex disaster, and drives studies on its utilization. We conduct R&D on cancer and other diagnostic agents and drug treatments enabled by medical uses of radioisotopes (RI). Uses of radiation and RI for agriculture and industrial manufacturing are also covered by F-REI, which engages in the development of new technologies in these areas.



### 5 Collection and Dissemination of Data and Knowledge on Nuclear Disasters

#### Sharing data and knowledge that only Fukushima can offer to the world

F-REI aims to contribute to future disaster countermeasures by collecting data and findings from Fukushima, and communicating them worldwide. Information includes measurements of forest vegetation, soil, and other environmental dynamics pertaining to an ecosystem’s recovery from radioactive contamination. Additionally, input from the social sciences will be leveraged to build disaster-resilient, dynamic future communities.

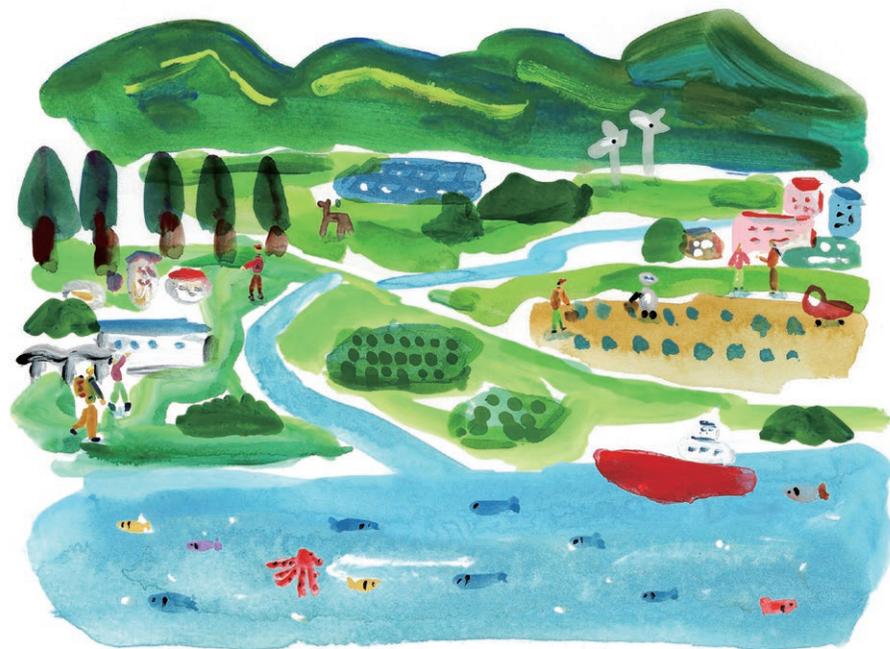


## Forests as a key link in a rich cycle of natural resources

Due to the prolonged absence of local residents and shortage of industry players, vast tracts of neglected forests and unused farmland remain in parts of Fukushima where people were evacuated from their homes in the wake of the 2011 disaster. F-REI envisages a near future in which these areas are once again utilized with the help of robots and drones.

In the forests, fully-grown trees will be felled by robots and transported by hydrogen-powered self-driving vehicles to be processed into new materials, energy sources, fertilizers for agricultural production, and other useful renewable resources. Forests that are managed properly become healthier, developing high porosity soil that is better able to store water. The high permeability soil draws rainwater deep into the ground, where it is stored and becomes groundwater that seeps into rivers. The groundwater is used for agricultural production, and feeds the ocean. Drone-aided reforestation breathes new life into forests, and proper care of forests encourages the growth of trees that are once again utilized. This circular use of resources that involves the cycle of felling, utilizing, planting, and growing has far-reaching ripple effects.

The circular use of resources can be adopted not just in Fukushima but many other parts of Japan—a country with a large forest cover—and it helps create a renewables-rich country.



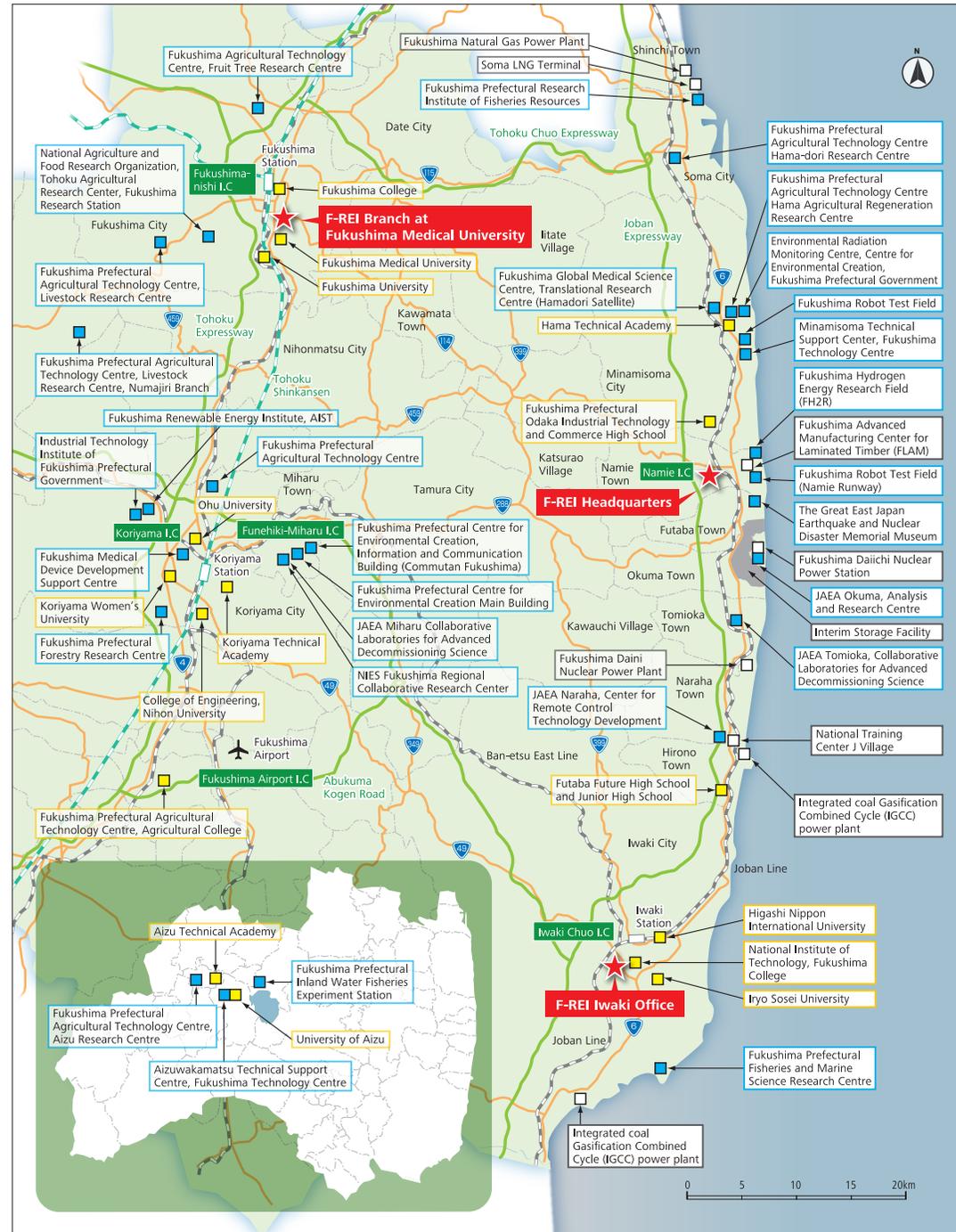
## Understanding radiation to put Fukushima's experience to good use

Suffering a nuclear disaster has left Fukushima with both responsibilities and opportunities. Among the missions of F-REI are encouraging the accurate understanding of radiation for its effective utilization, and relaying to the future the knowledge drawn from Fukushima's experience. Sensible use of radiation in various areas can contribute positively to the quality of life through improved well-being. For instance, it can offer treatments for conditions that current medicine cannot cure, and is useful for elucidating the growth mechanisms of fruit, vegetables, and other agricultural crops for the production of tastier produce.

Documenting and sharing Fukushima's journey toward reconstruction from a complex disaster can also help people around the world to learn. Pieces of natural science data, such as those pertaining to recovery from radioactive contamination, as well as social science findings, such as those pertaining to modes of community engagement in rebirth and regrowth, can become knowledge of great value for future generations.

## F-REI's related institutions and facilities

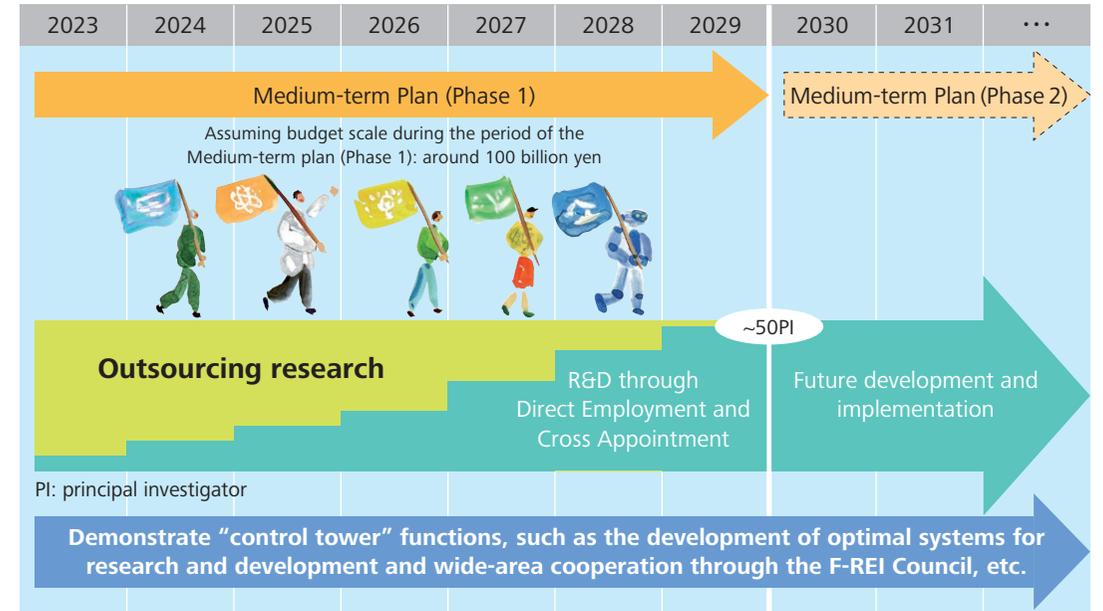
Conducted with a focus on reconstruction, Fukushima-based R&D efforts preceding F-REI include those by Fukushima Robot Test Field established under Fukushima Innovation Coast Framework, and by Fukushima Hydrogen Energy Research Field. Through means such as the establishment and operation of the F-REI Council, F-REI serves as a central hub for these efforts, working in close collaboration with the organizations involved to ensure that the resulting benefits have nationwide reach.



★ Fukushima Institute for Research, Education and Innovation (F-REI)  
 ■ Research institutes and facilities ■ High schools, universities and other education providers □ Others JAEA: Japan Atomic Energy Agency

## Roadmap

Phase 1 of F-REI's Medium-term plan covers the seven years from its inauguration in April 2023 to March 2030, and includes the following medium- to long-term goals for developing its activities: Organizing its R&D system, centering on the appointment of principal investigators; installing the necessary facilities; joint research with businesses, start-up support and other projects for the industrialization of technology; and initiatives for human resource development for future generations, such as seminars for partner graduate school students and other young people.

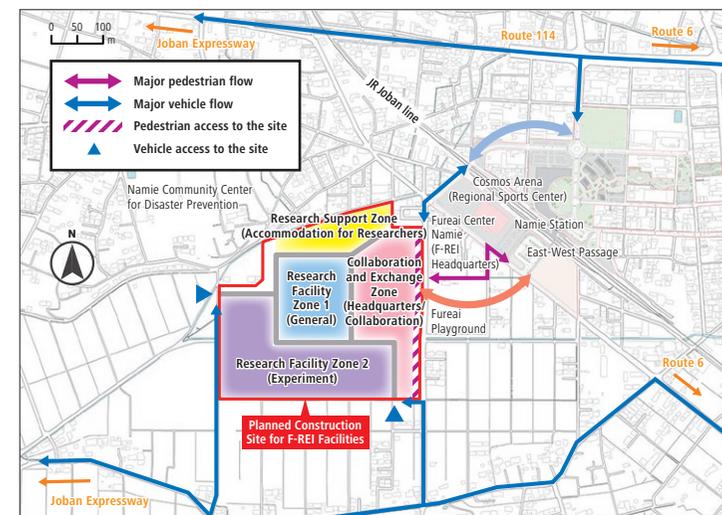


## Basic Plan for the Facilities of F-REI

As of 2024, F-REI is partially renting, and operating from, Fureai Center Namie in Namie Town, Fukushima Prefecture. The Government of Japan is expected to develop facilities on the west side of Namie Station by the end of FY2030.

Facility zones and traffic diagrams Decision by the Minister for Reconstruction on January 30, 2024

The site will contain a research facility (the "urban facility" of a "city planning project") with an area of about 169,000 m<sup>2</sup>.



Source: Geospatial Information Authority of Japan (Source for areas around the Namie Station: Ground plan for the Namie Station Area Development Project (modified in accordance with the changes of area boundaries on February 3, 2023))  
 Note: The above zones and routes indicate the present plan, which may be subject to changes in line with the further consideration of the details.

Zone	Main Facilities
Collaboration and Exchange Zone	Headquarters Facility Facility for management and operation
	Headquarters Support Facility Facility to support research activities and other duties of F-REI stakeholders, and for the PR exhibition of F-REI's activities and research results.
	Library/Information Facility Facility where researchers can conduct literature research, and where servers for storing research data are installed.
	Auditorium/Hall Facility Facility to present research results, deliver lectures for cultivating talents, and provide visitors with information.
Research Support Zone	Short-stay Accommodation Facility Facility for temporarily accommodating postdoctoral researchers participating in joint research as well as graduate students engaging in collaborative graduate programs.
Research Facility Zone 1	Research/Experimental Facility Facility where F-REI researchers and collaborators stay and conduct research on a daily basis.
Research Facility Zone 2	Specific Experimental Facility Facility where F-REI researchers and collaborators conduct advanced research activities.

Source: The Basic Plan for the Facility of Fukushima Institute for Research, Education and Innovation (F-REI) (Decision by the Minister for Reconstruction on January 30, 2024)  
 \*Some information has been edited or added.