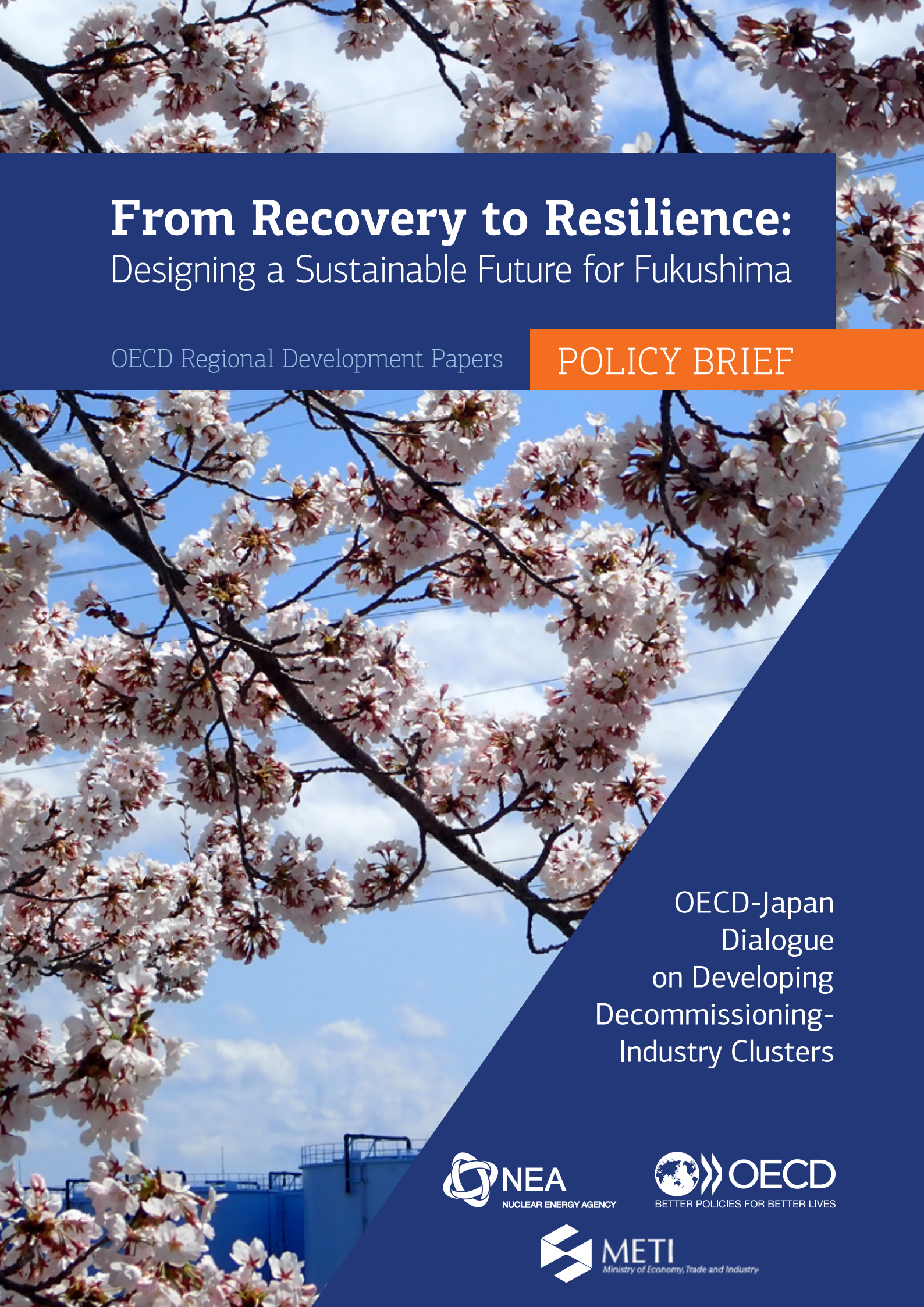

From Recovery to Resilience:
Designing a Sustainable Future for Fukushima

OECD Regional Development Papers

POLICY BRIEF

OECD-Japan Dialogue on Developing Decommissioning-Industry Clusters

NEA NUCLEAR ENERGY AGENCY

OECD BETTER POLICIES FOR BETTER LIVES

METI Ministry of Economy, Trade and Industry

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Acknowledgements

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Photo credits

Yumiko Yokokawa, pages 2 and 3 | Britain's Energy Coast Business Cluster (BECBC), page 13 | All other pictures, courtesy of METI (Japan)

Preface

In the ten years since the devastating triple-disaster of earthquake, tsunami and nuclear meltdown in Fukushima, Japan's progress in rebuilding the local area and strengthening resilience has been remarkable.

The 30 to 40 year, JPY 8 trillion (1.4% of Japan's GDP) process to decommission Fukushima Daiichi Nuclear Power Station provides a rare window of opportunity to cement this progress. Coupled with national initiatives to invest in local research and development, and initiatives led by the Fukushima Innovation Coast Promotion Organization (FIPO), Japan can drive and accelerate long-term, sustainable growth in the region and beyond.

Evidence from the creation of industry clusters centred around decommissioning in other OECD regions points to significant potential to shape growth strategies, develop local talents and provide an engine for the region's long-term development. Local firms, governments, research institutions, universities, schools and communities, and, in Fukushima's case, the Tokyo Electric Power Company, all have roles to play in this effort.

This Policy Brief is the outcome of a two-year Policy Dialogue led by the OECD and the NEA with the Government of Japan, Fukushima Prefecture and FIPO, drawing, in addition, on lessons learned from peer regions and cities in OECD Member countries with experience in recovering from natural disasters or other shocks.

It takes stock of the recovery efforts since the 2011 disaster and discusses options and challenges for moving forward. It provides four key actions for Fukushima to fully capitalise on the opportunities presented by the decommissioning process, its local assets and its reputation for technological innovation to strengthen resilience:
1. Develop an industry cluster founded on decommissioning;
2. Support local firms and up-skill the workforce;
3. Diversify the economy to resist and recover from shocks;
4. Develop a regional vision for sustainable development through bottom-up approaches, leveraging each cities' strength and specialisation.

Looking ahead, Fukushima has an opportunity to ensure a safe and rapid decommissioning process and support evacuees returning to their homes, while also strengthening long-term development potential and retaining talent and skills in the region, especially among young people. The goal is not only to recover, but to build a strong and sustainable future for the region, with local communities at the centre.

We stand ready to help.

Mathias Cormann
Secretary-General, OECD

William D. Magwood, IV
Director-General, NEA

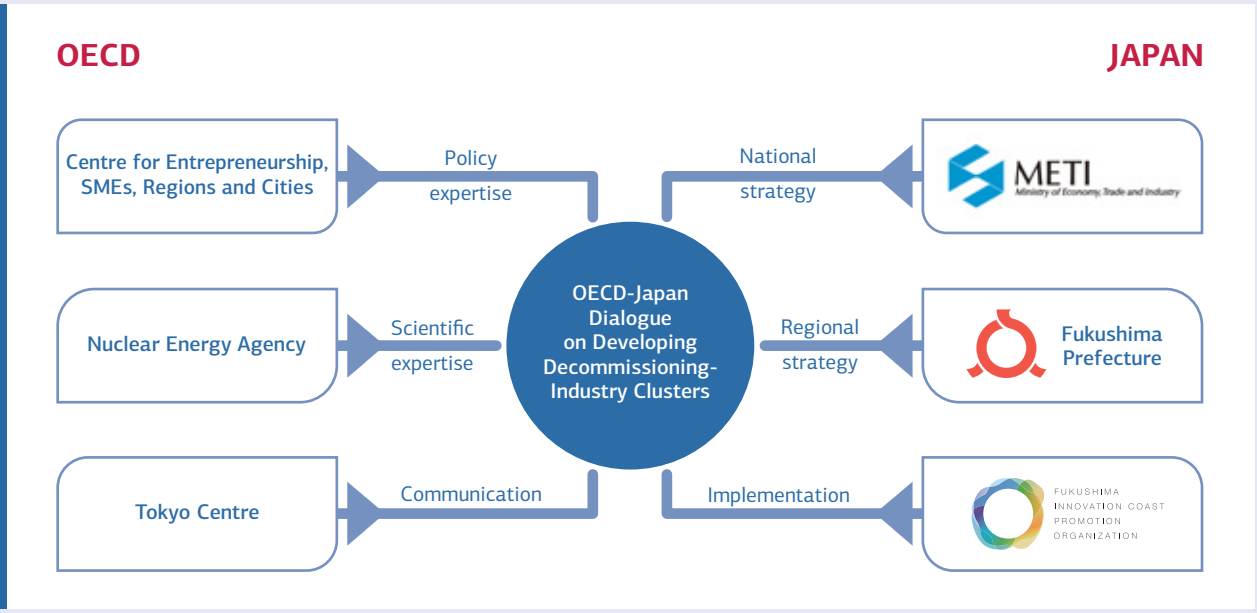
Introduction

This Policy Brief presents the outcomes of the OECD-Japan Policy Dialogue on Developing Decommissioning-Industry Clusters in Fukushima. The dialogue was conducted in 2019–20 to support the development of industry clusters focused on decommissioning the Fukushima Daiichi Nuclear Power Station, and to contribute to long-term recovery and local economic development in Fukushima's coastal area.

This brief discusses the opportunities and challenges related to the decommissioning, and the policy options for sustainable recovery and development in the region. It also presents experiences and lessons relevant to Fukushima from other OECD regions and cities. While the brief is designed for local readers (e.g. policy makers, the private sector, academia, civil society), it also aims to raise the global profile of Fukushima's ongoing reconstruction and recovery efforts.

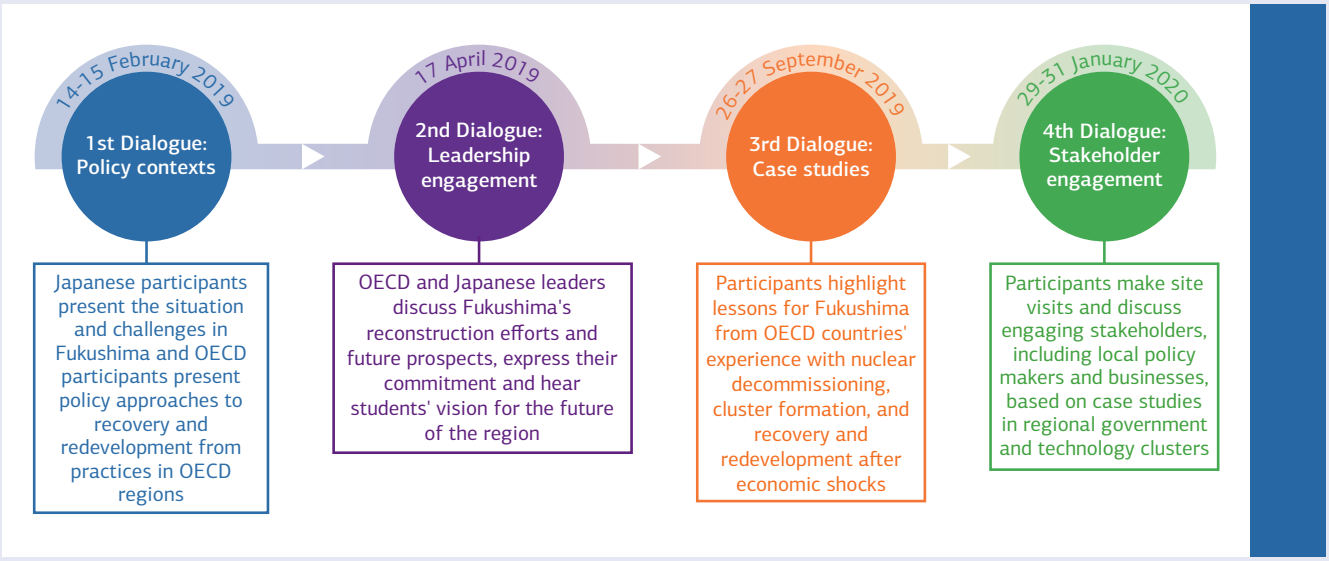
Participating organisations

The Policy Dialogue was led by the Organisation for Economic Co-operation and Development (OECD) and OECD Nuclear Energy Agency (NEA) in co-operation with the Japanese Ministry of Economy, Trade and Industry (METI), Fukushima Prefecture and the Fukushima Innovation Coast Promotion Organization (FIPO).



Main activities

The Policy Dialogue provided a venue for open discussion between OECD experts, central and local governments, other local stakeholders and the private sector. It aimed to improve implementation of the Fukushima Innovation Coast Framework and ensure long-term sustainable recovery and development, with a focus on establishing decommissioning-industry clusters in the area. The dialogue also contributed to increasing global awareness of Fukushima's progress and challenges.



Summary: Policy options to build a sustainable and resilient future in Fukushima

Ten years ago, a devastating earthquake, tsunamis and nuclear accident in Japan took thousands of lives and affected millions of people. This unprecedented disaster generated numerous lessons for policymakers in Japan and around the world on how to prepare, respond to and recover from shocks, and build resilient communities, regions and societies.

The 30 to 40 year process of decommissioning Fukushima Daiichi Nuclear Power Station offers the impetus and a rare window of opportunity to cultivate long-term, sustainable growth and resilience in the region and beyond.

Significant progress was made during the last decade in reconstructing the Fukushima region and reducing radiological risks from the nuclear power plant. This experience and lessons from the recovery can guide others in the future.

The JPY 8 trillion (USD 77 billion) decommissioning project, national initiatives to invest in local research and development, and initiatives led by the Fukushima Innovation Coast Promotion Organization (FIPO) can enable innovation that could serve as an engine for the region's long-term regional development.

However, challenges persist. For example, Fukushima faces continuing population outflows, averaging 10 000 people per year, and difficulty retaining talent and skills, especially among young workers, which hinders economic vibrancy and the upkeep of public services. Restoring the region's reputation and liveable communities with opportunities to work also remains a challenge.

The decommissioning of Fukushima Daiichi Nuclear Power Station presents unique opportunities for local business and regional development. To seize these, Fukushima needs policy frameworks to develop a decommissioning-industry cluster with strong local participation and collaboration with key actors, as well as long-term and sustainable regional development strategies building on policy options for action.

1. Developing a decommissioning-industry cluster

- **Define the decommissioning industry and develop local dialogues** to reduce information gaps and align capabilities to technical requirements.
- **Create a collaborative business environment in the region**, in which local companies complement each other while also competing to innovate.
- **Strengthen cluster management organisations and leadership** to play a catalytic role in cluster development.

2. Supporting local firms and up-skilling the workforce

- **Inventory local supply chains and consider preferential tendering** in Fukushima to analyse and match local capabilities with the technical requirements of the decommissioning projects, and support participation of small- and medium-sized enterprises.

- **Develop and retain local skills and talent** through continued investment in human resources, R&D and vocational training, especially for younger generations.
- **Develop a 'brain circulation' strategy** between local firms and local, national and international universities and research institutions to facilitate human resource mobility.

3. Recovering from shocks by diversifying the economy

- **Improve public services to enhance regional attractiveness** in ways that go beyond industrial development perspectives and help retain a skilled and talented labour force.
- **Support an endogenous approach** that focuses post-crisis national support into developing the region's internal capacity for growth to prepare for phasing out of government assistance.
- **Promote smart specialisation** approaches that deepen a region's strengths while diversifying its options.
- **Build a platform for collaboration among regional actors** from the private, public and academic sectors in the design and implementation of a strategy for development.

4. Developing a regional vision through bottom-up approaches

- **Use Functional Urban Area to analyse labour market connectivity** within Fukushima's coastal area and encompassing adjacent districts.
- **Apply a bottom-up approach combined with a central facilitator** to enable communication, co-ordination and coherence between different locations and layers of stakeholder activity.
- **Identify complementary roles for municipalities** that respond to their size, economic functions and challenges.
- **Shape a vision using the Sustainable Development Goals** for long-term regional development leveraging each city's strengths and specialisation.

Decommissioning Fukushima Daiichi Nuclear Power Station

In March 2011, the Great East Japan Earthquake triggered an accident at the Fukushima Daiichi Nuclear Power Station. The earthquake, tsunamis and nuclear disaster devastated communities and the daily lives of inhabitants, and brought economic activity in the region to a halt. Since then, tremendous efforts were made by local, regional and national governments, and citizens and companies to rebuild the region better than it was.

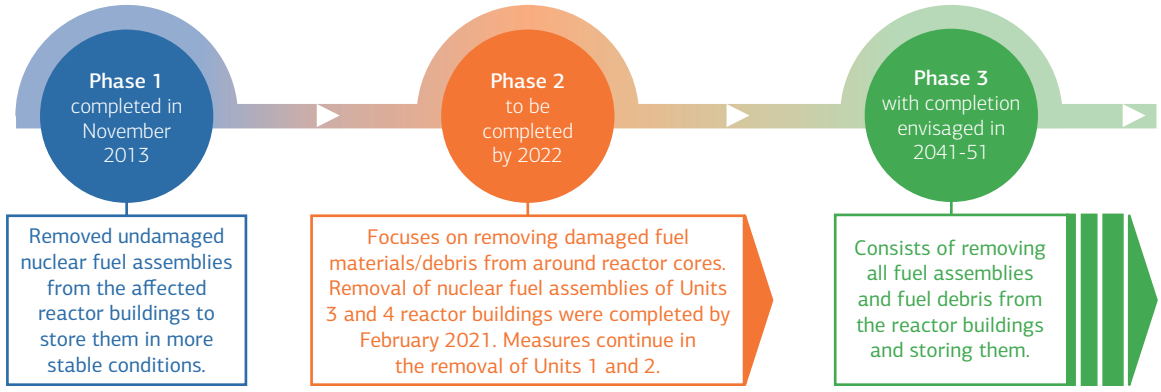
Decommissioning Fukushima Daiichi Nuclear Power Station requires removing all major radiological sources, reducing risk from the site and bringing the remaining facilities under stable management. The government estimates the process will last 30–40 years from when the cooling of nuclear fuels was first stabilised in December 2011.

Although many countries have experienced decommissioning and dismantling of nuclear reactors, Fukushima Daiichi is unique. In the history of nuclear engineering, there had never been a case of dismantling nuclear reactor cores damaged by natural disasters. This is a challenge, not only for Tokyo Electric Power Company (TEPCO) but also for the local community due to the risks from damaged nuclear fuels remaining on site.

The decommissioning and dismantling projects include handling radioactive materials, nuclear fuel materials and various forms of radioactive wastes. The government's panel of experts estimates the total costs at JPY 8 trillion (USD 77 billion), accounting for 1.4% of Japan's GDP.

The decommissioning projects consist of three key phases:

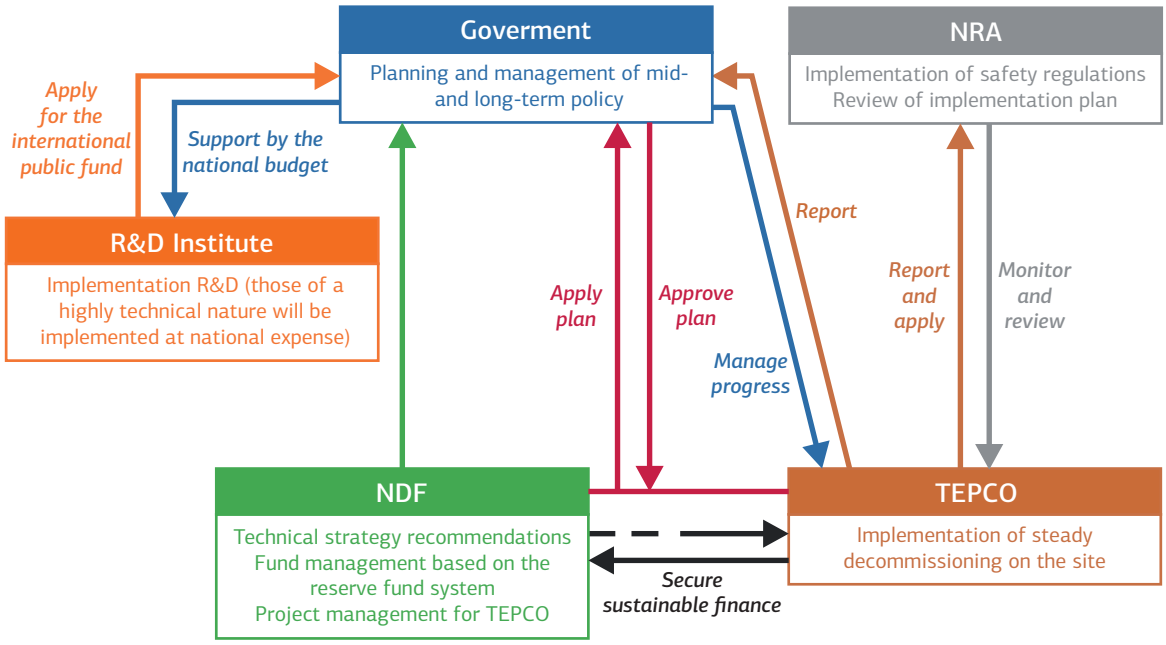
Roadmap for the decommissioning projects



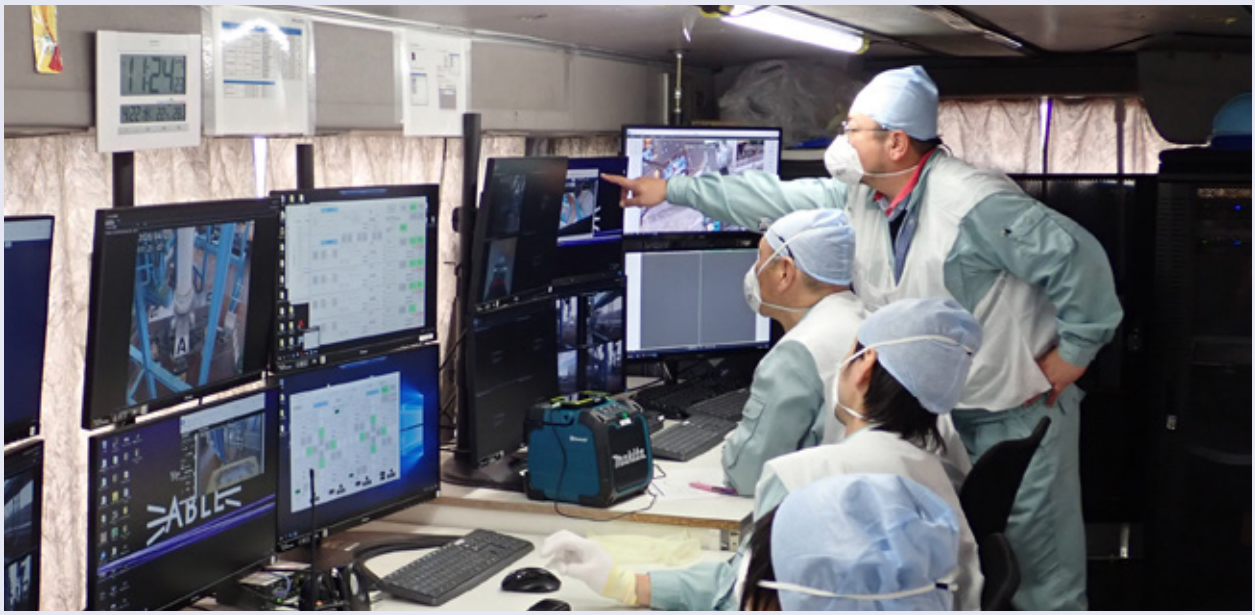
At the same time, regional communities around the site and residents displaced by the evacuation orders are recovering from the disaster. Thus, a sound management system must be in place not only to maintain compliance with safety and security requirements, but also to strike the balance between risk reduction and well-being of the people in the region.

Communication of adequate and timely information to residents, and the involvement of regional stakeholders is necessary for the government and TEPCO to make decisions. To this end, the Chamber of Decommissioning and Contaminated Water Measures in Fukushima has been established, consisting of the central government (METI, Nuclear Regulation Authority), TEPCO, 14 local government chiefs and eight local affiliates and intellectuals. Such efforts will also be necessary for the government to prevent reactions that are not based on scientific grounds – such as trade restrictions or reputational damage – from occurring internationally and domestically.

Actors in the decommissioning of Fukushima Daiichi Nuclear Power Station



NDF: Nuclear Damage Compensation and Decommissioning Falicitation Corporation
NRA: Nuclear Regulation Authority
TEPCO: Tokyo Electric Power Company Holdings (aka Tokyo Denryoku)



1. Developing a decommissioning-industry cluster

Tokyo Electric Power Company (TEPCO) is carrying out JPY 8 trillion (USD 77 billion) in decomissioning projects aimed at reducing and managing the risks of the damaged nuclear fuel materials on site. This offers an opportunity for local businesses and future development of the region, but creating a decommissioning-industry cluster with strong local participation is key. Examples of successful industry clusters in OECD countries provide useful lessons.

How can the decommissioning process help structure local industry?

Nuclear decommissioning projects could use robots and remote-controlled technology to dismantle the contaminated parts of the plant in order to enhance decommissioning safety. National and prefectural governments initiated a range of initiatives, including R&D in the decommissioning and robot industries. Promoting industry clusters in Fukushima's coastal area is at the core of the Fukushima Innovation Coast Framework.

Expectation is high that the JPY 8 trillion (USD 77 billion) being spent on decommissioning will benefit local firms while ensuring a safe and rapid decommissioning process. However, engaging local firms in these world-class technology developments remains a challenge. Universities and research institutions are particularly relevant, as Fukushima's industry faces shortages in engineering, technical and business capabilities in contributing to the decommissioning projects. Developing a decommissioning-industry cluster with strong local participation is crucial in this regard.

Policy options

Define the decommissioning industry and develop local dialogues

Information gaps might prevent local firms from participating in decommissioning projects managed by TEPCO (and its affiliated companies). Dialogue between governments, TEPCO, local businesses, universities and research institutions can identify and reduce the gap between the capabilities of local enterprises and the technical requirements of decommissioning projects. The first step is to define the decommissioning industry (including what industries and technologies will be needed in future decommissioning activities) and how local industries and firms can participate in the process, and to make the information locally available. It is crucial that national and prefectural governments work together with TEPCO because methodologies for dismantling the nuclear reactors – for instance collection of melted fuel debris – are still under investigation.

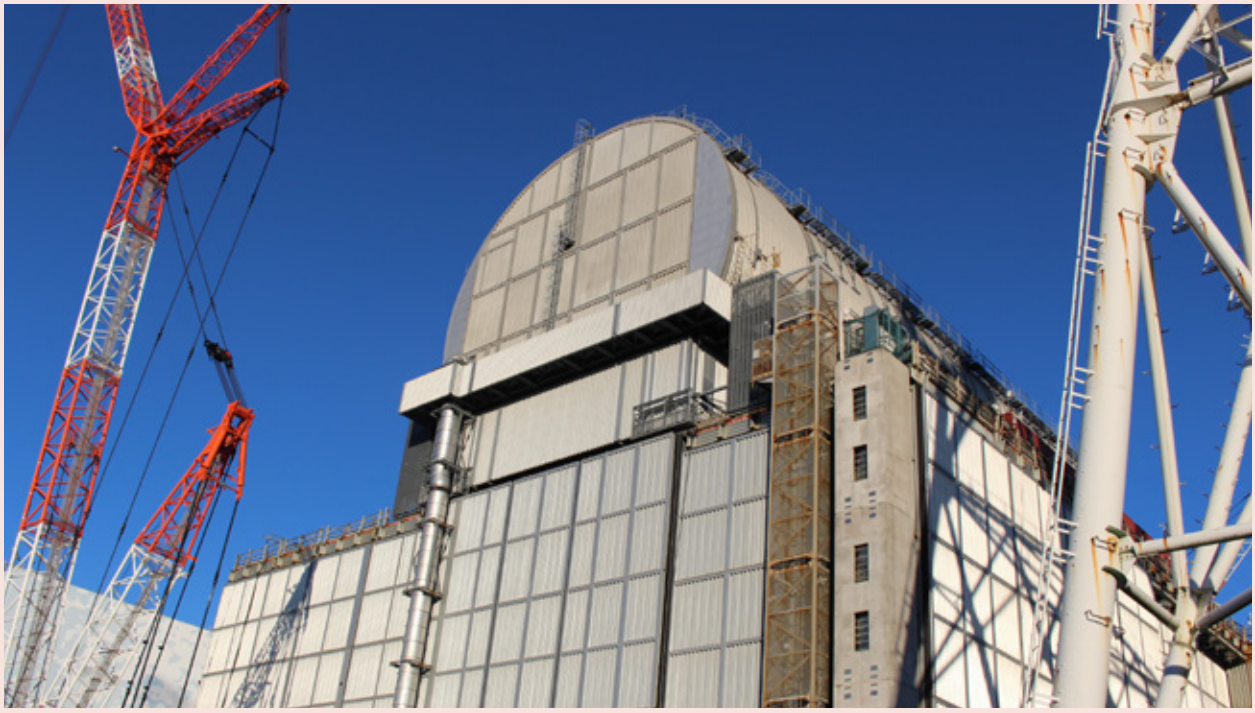
Create a collaborative business environment in the region

Policies to foster industrial clusters have two roles: (1) facilitating clustering through incentives, infrastructure, etc., and (2) encouraging collaboration and innovation. From the experience of OECD regions, successful industry clusters have common enablers, such as the presence of universities (human resources, commercialisation of academic research), local leadership and co-operative relationships between local actors (Box 2).

Creating a co-operative environment where local companies complement each other while also competing as part of an industry cluster is a key success factor. **Britain's Energy Coast Business Cluster** (Case 1) shows how a large multi-function nuclear site and small businesses operating in the local area share knowledge and engage through an industry cluster.

Strengthen cluster management organisations and leadership

Local leadership and strong cluster management organisations play a catalytic role for cluster development. The United Kingdom's **Nuclear South West** cluster (Case 2) demonstrates how local enterprise partnership can engage local and regional governments and establish a co-operative group of nuclear-related and spin-off industries. As in the case of Denmark's **Odense Robotics** cluster (Case 3), a strong management organisation can develop co-operative frameworks among local enterprises, universities and research institutes. TEPCO's engagement in such frameworks is indispensable.



Box 1. What is the nuclear decommissioning industry?

The decommissioning industry consists of nuclear, mechanical, electrical, environmental and civil engineering. The activities of decommissioning include:

- **Dismantling and remediation**: Contractors that provide deconstruction, decontamination and waste management services. Project planning and management can also be included.
- **Decommissioning equipment**: Contractors that provide equipment for inspection, characterisation and measurement, to capture images, measure dose rates, collect radionuclide inventory, indicate location and distribution of contamination, and monitoring. Contractors also provide machinery for dismantling and decontamination processes.
- **Technology development**: Research institutes and other entities that provide new decommissioning technologies to enhance safety, efficiency and cost-effectiveness.

Industrial clusters that cover decommissioning technologies exist in several OECD-NEA member countries: South West Germany (centred in Karlsruhe, Germany) and Switzerland, Cumbria and South West England (United Kingdom), and Burgundy and Normandy (France).

Box 2. Success factors in cluster development

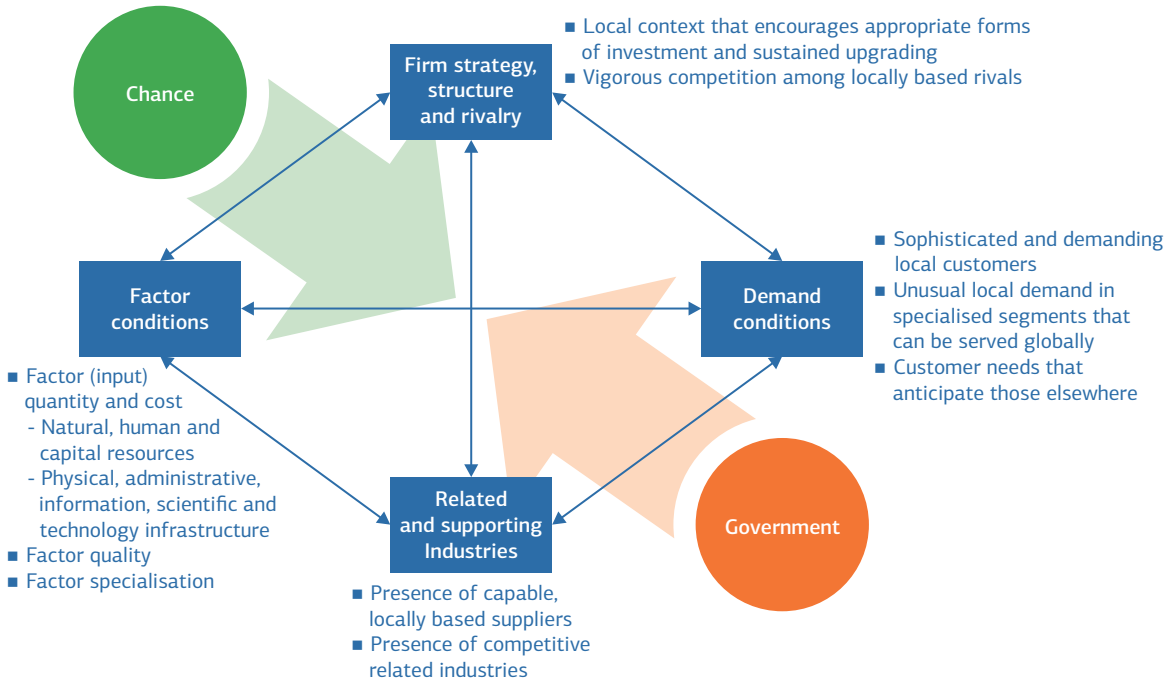
Clusters are "geographic concentrations of interconnected companies, specialised suppliers, service providers, firms in related industries, and associated institutions in particular fields that compete but also cooperate" (Porter, 1990).

There are a number of factors associated with successful clusters in knowledge-intensive industries such as robotics:

- **Quality of human capital**: The presence of local universities supplying relevant expertise to the cluster, vocational education and training institutes providing mid-level skills, and research centres conducting applied research. Talent attraction is also important to bring in human capital that is not possible or would take too long to develop locally.
- **Research commercialisation**: Research undertaken at universities and research centres should be commercialised, which in turn requires appropriate intellectual property legislation, availability of risk capital and government support, for example through funding for early testing, including via public procurement.
- **Co-operation**: Can be between companies and take the form of business consortia or supply-chain relationships. Collaboration between businesses and research organisations is important to ensure that the cluster constantly relies on industry-relevant skills and research.
- **Local leadership**: Can play a catalytic role for cluster development. In some cases, active collaboration between local stakeholders (e.g. local governments, business associations, leading companies, universities, etc.) has led to the establishment of cluster management organisations that promote the activities of the cluster, both nationally and internationally.
- **Quality of life**: Knowledge-intensive clusters require skilled workers likely to be interested not just in the salary, but also in the overall quality of life in the place they live. Social networks, people-oriented procedures and good infrastructure (e.g. sport and culture) are some of the factors that impact the attraction and retention of high-skilled people in a given place.

Source: Porter, M. E. (1990), *The Competitive Advantage of Nations*, Harvard Business Review, 68(2), 73-93; OECD (2009), *Clusters, Innovation and Entrepreneurship*, Local Economic and Employment Development (LEED), OECD Publishing, Paris, https://doi.org/10.1787/9789264044326-en.

Porter Cluster Diamond Model



Practices in other OECD regions

Case 1. United Kingdom: On Britain's Energy Coast, a large multi-function nuclear site and small local businesses share knowledge and engage through an industry cluster.

Britain's Energy Coast Business Cluster (BECBC) was established in Cumbria in 2004, coinciding with the formation of the National Decommissioning Authority. The cluster began with a small group of local companies motivated by the change in their route to market and wanting to shape their future environment. Through a programme of regular events, the cluster became a key to engagement between the Sellafield multi-function nuclear site and the local supply chain. In 2012, BECBC ran a large-scale conference attracting over 500 delegates to play a more strategic role in the economic development of the region.

Today the business cluster represents organisations of different sizes, but focuses on small businesses operating in the local area, with membership totalling over 320 companies. BECBC's areas of businesses target nuclear, defence, mining, renewables and energy infrastructure. Some BECBC members provide high-tech services and technologies developed and utilised by Sellafield and others, such as technology firms Createc and Forth Engineering, and the National Nuclear Laboratory. Many of them have business and co-operative linkages with industries and institutes involved in the Fukushima Daiichi Nuclear Power Station decommissioning programme.

BECBC holds monthly member meetings and delivers member-led training for businesses and organisations on a variety of topics. BECBC also engages with regional development agencies, and connects investors and local government to deliver regional marketing and inbound investment. The BECBC runs Innovator Breakfasts, introducing 'problem holders' to technological solution providers. It also aggregates funding for engagement between industry, business and high-school students across the region. The latter plays a significant role in Cumbria, the leading region in England for employer and student interactions. To retain a young, talented workforce, a shadow board consisting of people aged 18-30 was formed to understand how to attract young people to remain in the region.

FOR MORE INFORMATION: www.becbusinesscluster.co.uk

Case 2. United Kingdom: Nuclear South West takes a regional collaborative approach to map local expertise and offer opportunities to local firms.

Nuclear South West, the nuclear cluster for the South West of England, aims to secure expertise for 15 planned nuclear industry projects. The region adopted a collaborative regional approach to enable co-operation between stakeholders. Its three main domains of activity are: (1) digital (photonics, big data and health); (2) advanced engineering (nuclear, marine and aerospace); and (3) traditional sectors (farming, tourism, construction and defence).

In order to develop clusters, a local enterprise partnership was formed to engage the region and offer opportunities to local firms. Analysis and mapping of local entities revealed that South West England offers great potential for technology clusters thanks to the region's strength in engineering, the presence of consultancy and IT companies, and high-precision manufacturing. Universities with strength in art, culture and creative industries make the region attractive as a place to live.

FOR MORE INFORMATION: www.nuclearsouthwest.co.uk

Case 3. Denmark: Through cluster management, Odense Robotics transforms local strengths into synergies to compete in a fast-emerging international arena.

The Odense Robotics cluster is the epicentre of Denmark's growing robot and automation industry. Odense is home to half of the sector's producers in Denmark, which account for half the country's robotics exports and 37% of robotics turnover. Odense focuses on collaborative robots (so-called "cobots"), mobile robots and food automation. The cluster has grown steadily, reaching 133 companies in 2019, representing a 50% increase since 2015. Close to 70% of companies in the cluster were established after 2010 and almost 60% of them have fewer than 10 employees.

Cobots are the fastest-growing segment in industrial robotics, expected to increase tenfold by 2025 and account for 34% of all industrial robot sales. Cobots were invented in Odense by scientific researchers whose venture became the company Universal Robots, the world's market leader in this field.

The incubator Start-up Hub, launched in 2015 and located at the Danish Technological Institute, offers free research facilities for start-ups, which can also apply for vouchers to receive technical support from external experts. The incubator can host up to eight companies at a time, which can stay until their product is ready to be commercialised. A total of 20 companies were or are currently part of the incubator. Today, these employ more than 110 people.

Odense Robotics' main success factors can be summarised as:

- **A sophisticated domestic market generating initial demand:** The Odense robotics industry has been in place for more than 35 years, starting with initial investments in robot technology by the Mærsk Group at its Lindø shipyard.
- **A strong local ecosystem approach:** The Odense robotics cluster comprises active involvement by government, universities, private-sector companies and investors. In addition to the Start-up Hub, the cluster hosts a university recognised internationally for robotics and has more than 40 education programmes locally available. All of this is supported by the city of Odense.
- **Unique capabilities:** Odense grew particularly strong in the field of cobots, which have changed the manufacturing paradigm and created new markets.
- **Strong collaboration:** 83% of companies collaborate with other companies in the cluster and 85% collaborate with universities and research institutes.
- **A strong cluster management organisation:** The Odense Robotics Team, a cluster management organisation, proactively seeks to accelerate growth and innovation in the cluster through: attracting talent and upgrading skills; promoting innovation-oriented partnerships; accelerating start-ups; attracting international investors and multi-national enterprises; branding and marketing the cluster abroad; and business intelligence in the robotics field.

FOR MORE INFORMATION: www.odenserobotics.dk

Spotlight on Clusters in Action in Fukushima

Decommissioning: FIPO's ongoing initiatives

In 2014, the government of Japan launched the Fukushima Innovation Coast Framework (FICF). It aims at developing human resources and industrial clusters in the coastal area of Fukushima prefecture to generate innovative industry and employment. In 2017, the revised Act on Special Measures for the Reconstruction and Revitalisation of Fukushima created a legal ground for this national project. That same year, the Fukushima Innovation Coast Promotion Organization (FIPO) was established by Fukushima Prefecture as a core institution to promote the FICF, currently with 126 full-time staff (as of 1 July 2021).

The six key fields of activity are: (1) Decommissioning; (2) Robotics and Drones; (3) Energy, Environment, and Recycling; (4) Agroforestry and Fisheries; (5) Medical Care; and (6) Aerospace. The nuclear decommissioning-industry will have sizeable demand for engineering projects in the region.

In the area of decommissioning, the FICF promotes developing technologies and equipment necessary for the decommissioning (e.g. remote technologies, mock-up test facilities) and building an international R&D base to accelerate the decommissioning projects. For example, the Naraha Remote Technology Development Center began operation in April 2016 as an R&D and demonstration facility for the Fukushima Daiichi Nuclear Power Station. It is equipped with a virtual-reality system that helps planning and training for workers on the decommissioning projects, and a mock-up testing facility (60m in width, 80m in depth and 40m height). This area of the industry cluster will also benefit from support and opportunities in the education and R&D programmes of universities and JAEA (Japan Atomic Energy Agency).

While ensuring safe and speedy decommissioning of Fukushima Daiichi Nuclear Power Station, FICF also aims at involving local firms and residents, which leads to developing new business models for decommissioning around the world.

FOR MORE INFORMATION: www.fipo.or.jp/en and www.naraha.jaea.go.jp/en/

Spotlight on Clusters in Action in Fukushima

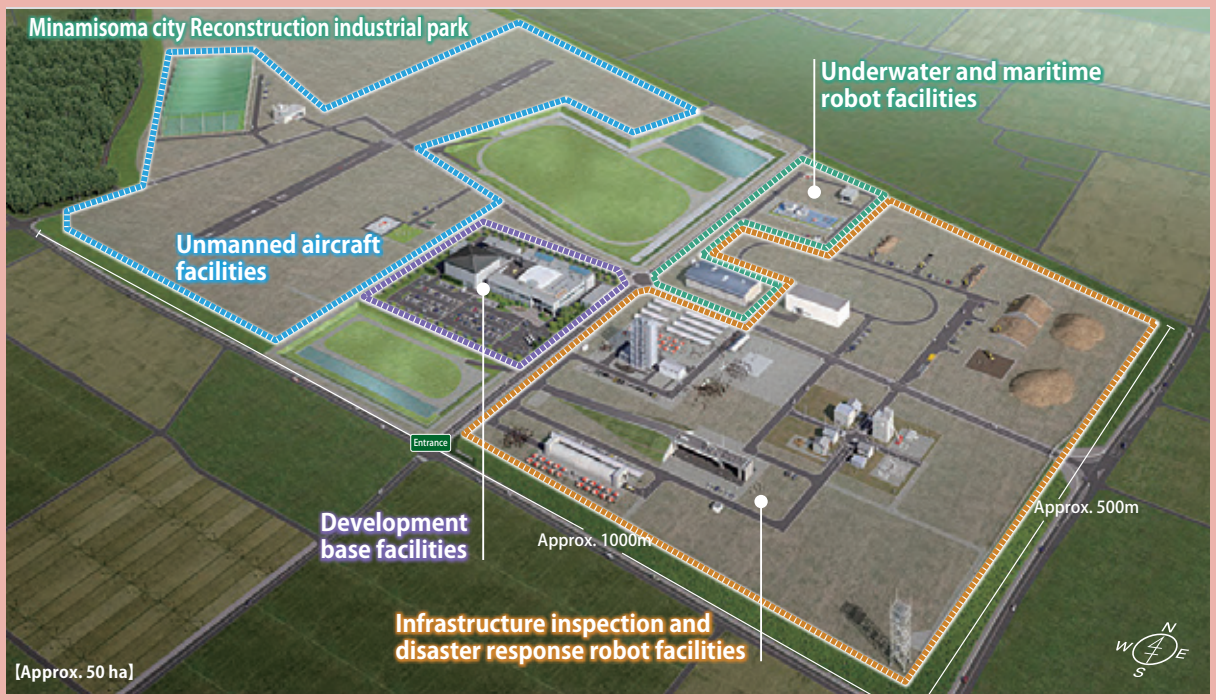
Robotics: Fukushima Robot Test Field

Fukushima Robot Test Field is one of the largest robot test fields in the world (1000m by 500m), including the largest airspace in Japan for unmanned aircraft. It provides verification, performance evaluation and operational training in actual operating conditions, mainly for ground, maritime, underwater and aerial robots utilised in logistics, infrastructure inspection and large-scale disasters. The Test Field has four main areas:

- Unmanned Aerial Vehicle (UAV) area: Japan's largest net-enclosed airspace, runway and airport provide a variety of testing environments, such as collision avoidance and long-distance flights.
- Infrastructure inspection and disaster-response area: Japan's first dedicated test site for infrastructure inspection and disaster-response demonstration testing. It simulates a wide range of potential disaster environments, as well as structural integrity over the lifespan of infrastructure (e.g. bridges)
- Underwater and above-water robot area: This area is used for underwater infrastructure inspections and disaster-response demonstration testing. Capable of simulating underwater environments at dams, rivers, submersed urban areas and harbours.
- Development base area: This area hosts the primary development facility. It is outfitted to facilitate preparations, processing and measurements for various tests, as well as performance evaluations, and offers a base for research activities.

In 2021, METI hosted the World Robot Summit (WRS), a competition and exhibition event that brings together robotics experts from around the world. The Fukushima Robot Test Field held the "Infrastructure and Disaster Response" category of the competition.

FOR MORE INFORMATION: www.fipo.or.jp/robot/en



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2. Supporting local firms and up-skilling the workforce

Although the JPY 8 trillion (USD 77 billion) in decommissioning projects led by the Tokyo Electric Power Company (TEPCO) present unique opportunities for job creation and long-term economic development, this requires an enabling environment for local firms and workers to play an active role. Preferential tendering is an option but needs complementary initiatives. Diagnosing the local enterprise landscape is a starting point to understanding which policies can encourage local SME growth. Investing in and engaging young locals is key to retaining skills and a talented local workforce over the long run.

How can local firms position themselves to participate in the decommissioning?

The decommissioning projects are estimated to last 30–40 years, with expenditures of JPY 8 trillion (USD 77 billion). Despite the opportunities for job creation and long-term economic development, local firms often lack the scale, specialisation and networks to access tendering. Few contracts were established with local firms, with the exception of a dismantling project undertaken from July 2019 to April 2020. Most mid-sized firms who took up contracts with TEPCO are from other regions. Despite the potential market from the decommissioning, local firms risk missing out on these opportunities to revamp the local economy.

Governments must understand the long-term benefits of engaging local businesses and developing an ecosystem that provides skills and services necessary for the decommissioning projects. An information gap exists between local firms and TEPCO (and its affiliated companies), and there is a lack of educational institutes and incubators to increase the science-base to steer innovation and foster entrepreneurship. Retaining relevant talent and skills, especially among young people, is a key to long-term development. Improving local public services and facilitating access to jobs will attract young people to Fukushima.

Policy options

Inventory local supply chains and consider preferential tendering

National and prefectural governments are seeking effective policy instruments to support the participation of local firms in the decommissioning projects in Fukushima. Despite potential risks to project cost and delivery schedules, incorporating secondary objectives such as social and local economic development into the projects should be more widely discussed.

Given the potential to reinvigorate the local economy, tools such as a local firm inventory, preferential procurement and skill development, should be considered (Box 3). The **State of Victoria**, Australia (Case 4) demonstrates the importance of combining a preferential procurement policy with skill training programmes. A diagnosis of local enterprises, creating a supply chain directory and sharing it with the market is also a good starting point for Fukushima to understand which policies can encourage local SME participation in the decommissioning projects.

Develop and retain local skills and talent

Investing in better services and improving the matching of local job opportunities with young workers are recognised as key strategies in several examples from OECD countries. The experience of **BECBC** (Case 1), which formed a board of people aged 18-30 to understand how to attract young people to remain in the region, implies that direct engagement among young people was more effective than inter-generational dialogue for retaining a young population. In **Victoria**, Australia (Case 4), the State government provides vocational training focused on apprenticeship that can lead to skill certificates, and training hubs to match trainees with employers. In **L'Aquila**, Italy (Case 7), introducing a post-graduate school helped attract investment in research and infrastructure, which made the city more open and international.

Fukushima is already working on this challenge. Futaba Future High School, a prefectural school established in 2015, provides project-based education to help students interact with local firms and communities. The prefecture also initiated company-visit programmes for high school students and revised the curriculum at vocational training schools (e.g. in robotics and renewable energy). In 2017, the Fukushima College of the National Institute of Technology, located in Iwaki, restructured their curriculum and introduced a decommissioning innovation programme in collaboration with the Japan Atomic Energy Agency to develop human resources with decommissioning skills. FIPO (Fukushima Innovation Coast Promotion Organization) also hosts business matching events for local companies as well as new companies and provides financial support to local companies for their R&D projects.

Develop a 'brain circulation' strategy

In the context of a declining population, retaining talented and skilled researchers and workers at local firms, universities and research institutes requires a multi-dimensional effort. Promoting 'brain circulation' can encourage labour mobility among companies and research organisations both within the region as well as nationally and globally. **Pittsburgh** (Case 5) and **Robotdalen** (Case 6) show how regional growth develops through dynamic innovation systems leading to a critical mass of opportunities.

Fukushima demonstrates strong potential in this respect. Although only two universities are located within the region, 25 universities were conducting on-site research projects as of September 2019, some of which might open permanent local branch-campuses or research bases. With strong national support, the Japan Atomic Energy Agency (JAEA) opened the Collaborative Laboratories for Advanced Decommissioning Science in Tomioka and the nearby Okuma Analysis and Research Center in order to support R&D in decommissioning and dismantling technology.

Box 3. Tools to expand local firms' access to markets

Preferential procurement adjusts purchasing by governments and state-owned enterprises to meet objectives other than cost-efficiency and can expand market access for specific groups. Key considerations in designing a preferential procurement programme include:

- Define local business and develop an inventory of them.
- Establish target values for local procurement, starting low and increasing it over time.
- Reduce the size of procurement packages so small businesses can participate in the tender.
- Set minimum local content targets for procurement over a certain value to create incentives for larger firms to sub-contract locally.
- Establish programmes to build the capabilities of local firms (e.g. mentor-protégé relationships, technical assistance and training to secure certifications, networking to support knowledge-sharing and capacity building).
- Provide concessional loans and guarantees to purchase equipment, and technical know-how to access public procurement opportunities.
- Provide a plan of future projects so that local firms can anticipate expansion and needed skills.

Source: OECD (2018), *SMEs in Public Procurement: Practices and Strategies for Shared Benefits*, OECD Public Governance Reviews, OECD Publishing, Paris, https://doi.org/10.1787/9789264307476-en.

Practices in other OECD regions

Case 4. Australia: The Local Jobs First Policy uses public procurement rules that enable and incentivise local businesses and workers to become more competitive.

The State of Victoria introduced the Local Jobs First Act in 2003 to ensure that local businesses receive a full and fair opportunity to compete for Victorian government contracts; to promote local enterprise development and local job creation; and to expose local industry to world's-best-practice and promote its international competitiveness.

The Local Jobs First Policy requires the following government projects to utilise a minimum level of local content: (1) designated Strategic Projects over AUD 50 million, for which there are specified minimum local content levels set by the State on a case-by-case basis (no less than 90% for construction and 80% for maintenance in accordance with the Act); and (2) Standard Projects, which are valued over AUD 1-3 million, depending on the location, for which there is a market-led approach to the minimum local content. As of July 2021, over 200 Strategic Projects were identified, with a combined value of close to AUD 100 billion and supporting more than 40 000 jobs across Victoria State.

In addition, for construction projects valued at AUD 20 million or above, the State introduced the Major Projects Skills Guarantee, a workforce training and skills development programme. Within this programme, 10% of labour hours must be performed by apprentices, trainees or cadets. When a company applies for a construction project under the Local Jobs First Policy, they must work with vocational education and training (VET) institutes to obtain some of the workforce as apprentices. The programme supported almost 3 500 apprentices, trainees and cadets since 2016.

Successful implementation of the Local Jobs First Policy can inspire TEPCO, and Fukushima prefectural and local governments to develop strategies to engage local firms. First, partnership with local industry is fundamental. Second, it is essential to recognise that value-for-money is more important than the lowest price. Third, it is crucial to understand local industry (supplier) capability, including the development of a database of local suppliers, knowledge of local value-added activities and high-growth-potential SMEs.

FOR MORE INFORMATION: www.localjobsfirst.vic.gov.au/

Case 5. United States: The city of Pittsburgh transitions from a declining industry to a developing one by using a cluster approach to reignite dynamism that attracts talent.

Historically, the city of Pittsburgh in Pennsylvania State prospered with a steel industry benefiting from proximity to regional coal reserves. Technological and market changes beginning in the mid- to late-20th century caused a long-term decline. Pittsburgh transitioned from the economic shock of a declining steel industry to hosting clusters for robotics and artificial intelligence. Universities, research institutes, technology-transfer organisations and federal research agencies are the key actors.

Success factors include a world-class university in computer science; a labour market rich in engineering backgrounds; an entrepreneurial ecosystem including incubators, and R&D investment by large companies in the region and the federal government; and strategic public-private partnership. The region's industrial heritage (e.g. a wide network of suppliers and firms), and a good and affordable living environment also contribute.

FOR MORE INFORMATION: www.pghtech.org

Case 6. Sweden: Robotdalen develops regional growth through dynamic innovation systems comprising government, business and universities.

Robotdalen is a regional cluster initiative in Västerås that started in 2003 as a winner of Vinnväxt, Sweden's national programme to develop regional growth through dynamic innovation systems. The cluster developed four core areas in robotics – (1) industrial robotics, (2) logistics automation, (3) field robotics and (4) health robotics – building upon a strong network of industry, local governments, universities and SMEs. National government innovation agencies, universities, knowledge and technology transfer platforms, and financing support organisations are the key actors. It succeeded in mobilising stakeholders throughout the region, including major companies such as ABB, Atlas Copco and Volvo. It hosts Sweden's first university course in robotics.

Success factors include large public investments, strong political support, financial support through the *Vinnväxt* programme (up to EUR 1 million per year for 10 years from the Swedish innovation agency matched by regional contributions), networks with large companies, and innovation and process support such as training and consulting.

FOR MORE INFORMATION: www.robotdalen.se/

3. Recovering from shocks by diversifying the economy

National and prefectural governments stress the need for Fukushima to design strategic regional development beyond the decommissioning projects. Policy responses to economic and social shocks in OECD countries illustrate regional development approaches, from government subsidies to the promotion of bottom-up initiatives and investments to leverage local assets. Experience shows that improving public services and regional attractiveness is key to rebuilding competitive regions.

How can decommissioning lead to inclusive growth in broader sectors?

A majority of Fukushima prefecture is sparsely populated and contains a wide range of non-urban areas. Declining population and a low density of business and people make it more costly to provide high-quality services (e.g. higher education) that can attract and retain a skilled and talented workforce.

The current economic reconstruction strategy for Fukushima sees the decommissioning of the Fukushima Daiichi Nuclear Power Station as the main driver of local employment. However, if the decommissioning projects are only based on TEPCO and other government-dependent resources, efforts to foster innovative industry clusters and make the region attractive again could fall short. Instead, national and regional policies should regard the decommissioning projects as a catalyst for inclusive growth in broader sectors.

Policy options

Improve public services to enhance regional attractiveness

To increase the attractiveness of the region, the strategic shift towards local asset-based development must include public services and other policies that go beyond industrial development perspectives. **L'Aquila**, Italy (Case 7) provides lessons for building public service and infrastructure in the context of a declining population. The city experienced substantial earthquake damage in 2009 and developed a knowledge-based redevelopment strategy to re-launch the economy of the region.

Support an endogenous approach

In times of crisis, support from national governments should, in part, aim to help regions re-establish their own economic capacity. The case of **Brandenburg,** Germany (Case 8) demonstrates how a region can drive structural transformation of its economy by shifting from a subsidy-based approach towards promoting local collaborations and realise its growth potential through strategic investments. Government incentives were used to encourage co-operation between municipalities that would generate benefits from scale and maintain competition between the various proposals.

Promote smart specialisation

Given the limited local resources in low-density areas, it is important to balance specialisation based on a region's strength and diversification adaptable to market shifts. Smart specialisation means specialising in certain areas while expanding into related fields where strengths can offer a competitive advantage. The case of **Mo Industrial Park**, Norway (Case 9) demonstrates how a redevelopment strategy enables small, specialised firms to find new markets and niches.

Build a platform for collaboration among regional actors

A common success factor in OECD regions overcoming socio-economic shocks stems from strong co-operation between governments, education institutions and the business sector in the design and implementation of a strategy for development. **Brainport** in the Netherlands (Case 10) overcame its economic crisis in the 1980's through a comprehensive 'triple-helix' model of regional innovation based on co-operation between businesses, universities and the government. The case of **Outokumpu** in Finland (Case 11) shows that local leadership is key to promoting such co-operation.

Practices in other OECD regions

Case 7. Italy: L'Aquila invests in services and infrastructure to transform into a more open city after a natural disaster destroyed its physical, economic and social fabric.

On 6 April 2009, the Abruzzo region of Italy was hit by a devastating earthquake centred in the regional capital, L'Aquila (population 72 800 at that time). As well as killing 309 people and damaging 10 000 buildings, the earthquake was an economic shock that destroyed the city's historical centre, disrupted the social fabric and jeopardised the long-term prospects of a region already facing population ageing and loss before the disaster. In the first years after the earthquake, reconstruction stagnated, with weak community engagement in the strategic choices for the future of L'Aquila. Due to extensive damage and restricted zones, many inhabitants remained displaced.

The OECD conducted a study to help design a strategy to re-launch the economy of the region. The recommendations covered four key areas:

- **Improve regional governance** by fostering inter-municipal co-operation, engaging civil society and the private sector, and improving accessibility and quality of information about reconstruction criteria and expenditure in order to restore trust in institutions and increase the efficiency of public spending.
- **Stimulate regional innovation systems** by prioritising innovation poles, facilitating inter-firm linkages between multinationals and SMEs and relationships with universities, expanding vocational training and improving skill matching in the labour market.
- **Leverage cultural and natural resources** by integrating them into regional development projects and tourism strategies.
- **Promote knowledge-driven redevelopment** by increasing the share of student residents, focusing on research excellence in natural and basic science and engineering, and strengthening links between research centres, cultural institutions and firms.

Following those proposals, L'Aquila established an international postgraduate school, and investments in research and infrastructure followed, making the city more open and international. Reconstruction also forced the redesign of services and infrastructure based on population and needs projections. In areas with declining populations, it was not effective to rebuild public facilities as they were before the earthquake. L'Aquila and 50 surrounding municipalities work together for a realistic and forward-looking vision.

Abruzzo shows that recovery requires endogenous resources to build long-term development while also increasing openness in order to attract external entrepreneurs, students, workers and capital.

FOR MORE INFORMATION: oe.cd/resilregs

Case 8. Germany: The Brandenburg region directed spot investment to high-potential localities and transitioned a subsidised economy to collaborative competition.

Brandenburg (population 2.5 million), the former East-German region surrounding Berlin, experienced tremendous structural change with the transition from a communist economy to an open market. After Unification in 1990, the region suffered an economic collapse that halved industrial production, with outflows of population and labour, requiring transfers and subsidies from the federal government and EU.

In 2004, the region identified 15 Core Regional Growth Areas to refocus its development approach on growth potential. Brandenburg's strategy promotes a bottom-up, endogenous approach building on infrastructure investment and the region's historic strength in human capital. The 15 "growth poles" receive preferential financing and must demonstrate endogenous potential. They must also design development strategies tied to the region's overall strategy and offer benefits to other territories. The policy targeted enough growth poles to induce other areas to become potential growth poles, resulting in a new spirit of competitiveness and co-operation between towns. The 15 poles comprise 35% of the region's population.

Case 9. Norway: Mo Industrial Park split a large, state-owned enterprise into small, private firms, multiplying the cluster's specialised niches and opportunities.

The Mo Industrial Park in the Nordland county of Norway occupies the site of a former iron ore and steel mill complex established after World War II as a state-owned enterprise. By the late 1970's, the facility employed about 20% of the 25 000 local population. In 1988, the Norwegian government shut down steel production and sold off assets but provided funding to redevelop the site. Redevelopment involved breaking up the large enterprise into specialised firms and allowing them to find new market niches. Steel continues to be produced at the site, but by small firms, and various metallurgical firms take advantage of the local industrial heritage of abundant, low-cost electricity and a workforce familiar with foundry operations. In addition, firms specialise in heavy industrial engineering and metals research, and a variety of other manufacturing. In 2015, the cluster hosted about 110 firms that employ about 2 300 people.

FOR MORE INFORMATION: www.mip.no/en/

Case 10. Netherlands: In Brainport the departure of a dominant firm triggers more dynamic and open approaches to innovation and competitiveness.

Located in the southern part of the Netherlands, Zuid-Nederland and its largest city, Eindhoven (population 214 000), experienced significant economic shocks since the 1980's. Due to the reorganisation and partial relocation of Philips corporation, the largest local employer, the region lost 15 000 jobs (almost half) in the 1990s. The shock triggered a structural change, including the overall mind-set in the region, based on enhancing innovation, which previously had a closed organisation mainly driven by Philips. A decrease in its international competitiveness drove the company to adopt open innovation, establish the first knowledge campus and create many spinoffs of existing business operations. A "triple-helix" form of governance brought together three leaders in the region – the mayor of Eindhoven, the president of the technical university of Eindhoven and the president of the chamber of commerce – to combine efforts of the private, public and educational sectors, and represent the interests of all three communities in mobilising their stakeholders.

FOR MORE INFORMATION: www.brainporteindhoven.com/int/

Case 11. Finland: The closure of a mine causes Outokumpu to diversify from extraction to higher-added-value exports of mining technologies and services.

Outokumpu, a small rural municipality in North Karelia, was the key mining area in Finland. The closure of the mine in 1989 resulted in long-term population decline, falling from a peak of 13 000 inhabitants in 1960 to below 8 000 inhabitants in 2002. In the face of this decline, the region transitioned from a mining-based economy to sub-contracting and exports of metal technologies and mining services. A private (former state-owned) company involved the national government, municipal and community leaders in developing a common vision and strategy that included setting up an industrial park. A local committee of companies and government proved effective in driving the strategy for structural transformation. The municipality provides vocational training to adapt the local labour market. Key lessons for Fukushima include specialisation from lower to higher value-added and focusing on core strengths, such as Outokumpu's large share of manufacturing (33% of area jobs) and outstanding mining know-how.

FOR MORE INFORMATION: www.outokummunteollisuuskyla.fi/?lang=en

4. Developing a regional vision through bottom-up approaches

Creating a shared vision is crucial for the sustainable development of Fukushima's coastal area. A requisite for bottom-up collaboration in shaping such a vision is understanding the economic dynamics and complementary roles of municipalities and local stakeholders. The concept of Functional Urban Area is useful to identify the right scale to co-ordinate policies.

How can administrations overcome fragmentation and harmonise initiatives?

Fukushima's coastal area, Hamadori, comprises two cities (Minamisoma in the north and Iwaki in the south) and eight small municipalities between them. Mountains separate the area geographically from the prefectural capital, Fukushima City. Although the coastal region is recognised as historically and culturally distinct, there is no administrative or political entity covering the entire region. Instead, the north has stronger ties to Sendai whereas the south is more closely linked with Mito and Tokyo.

Developing a regional vision requires engaging governments (central, prefectural and municipal), citizens, the local community and firms. Recently, the Futaba Eight, a mechanism for multi-stakeholder dialogues began in the region when, in September 2019, eight municipalities in Futaba County proposed a vision for part of the Fukushima region in a dedicated report "Futaba Grand Design". A number of other efforts were deployed to create a common vision of Fukushima-Hamadori. However, administrative fragmentation in Fukushima-Hamadori causes co-ordination challenges. While reconstruction visions and plans are developed at the municipal scale, discussion of where to invest (e.g. public facilities, industry clusters) at the regional scale is still embryonic and lacks consensus. The fact that the municipalities in the region are in different stages of reconstruction also challenges the design of an embracing and balanced vision for the future.

Policy options

Use Functional Urban Area to analyse labour market connectivity

The economic function of a region often extends beyond its administrative borders. Understanding how a region functions economically (e.g. labour markets) internally and in relation to its surroundings is crucial to a vision and policy tools for regional development. For example, analysing commuting flows can help a region improve labour market efficiency and connectivity within its perimeter and beyond.

The Functional Urban Area (FUA) approach can help understand the reality of economic activities and flows of people beyond administrative borders (Box 4). It can help co-ordinate policy, especially transport, spatial planning and housing, at appropriate geographical scale. OECD data shows that the coastal area of Fukushima does not have a large urban agglomeration to constitute a FUA, but is surrounded by four FUAs (Fukushima, Hitachi, Koriyama and Sendai). In-depth analysis of the labour markets and connectivity in relation to these FUAs will be useful. More broadly, OECD research shows that proximity to large cities (consumer and labour markets) may have a positive impact on the productivity of surrounding areas (up to 300-minute driving distance), which confirms the importance of connectivity to Tokyo and Sendai.

Apply a bottom-up approach combined with a central facilitator

The absence of a co-ordinating body can hamper effective co-operation and implementation in fostering local innovation ecosystems and advancing broader regional development. The Fukushima Innovation Coast Promotion Organization plays a leading role in implementation and works closely with Fukushima Prefecture and companies, but its scope is limited to industrial development.

Examples from OECD regions demonstrate that multi-stakeholder engagement and good governance are key to local development. Italy's **Inner Area Strategy** experience (Case 12) shows the benefits of combining top-down and bottom-up approaches, where national intervention enabled local engagement and collaboration. The initiative links national funding support to regional collaboration and priorities, and provides a venue for bringing mayors together. In **Western Scandinavia** (Case 13), the regional government and municipalities form a Committee for Sustainable Development that makes all strategic decisions for regional development issues, while a Forum for Competencies Development carries out labour market co-ordination.

Identify complementary roles for municipalities

The municipalities in Fukushima's coastal area vary in terms of size, economic functions, challenges and stages of reconstruction. Complementary roles among municipalities should be further explored. Understanding the economic dynamics and strength of each municipality in the region, and discussing how to enhance complementary roles, is key for collaboration and a pre-condition for consensus. In **Western Scandinavia** (Case 13), eight cities along the Swedish-Norwegian border collaborate under an integrated vision, leveraging each city's strengths and specialisation.

Shape a vision using the Sustainable Development Goals

The Sustainable Development Goals (SDGs) can shape a regional vision. The goals are comprehensive and interconnected, and can align sectoral policies and strengthen links between social, economic and environmental objectives. The SDGs are a powerful tool to engage civil society and citizens (youth in particular), and strengthen partnership with the private sector, which increasingly integrates the SDGs. The case of **Bonn**, Germany (Case 14) shows how cities use the SDGs to address local challenges.

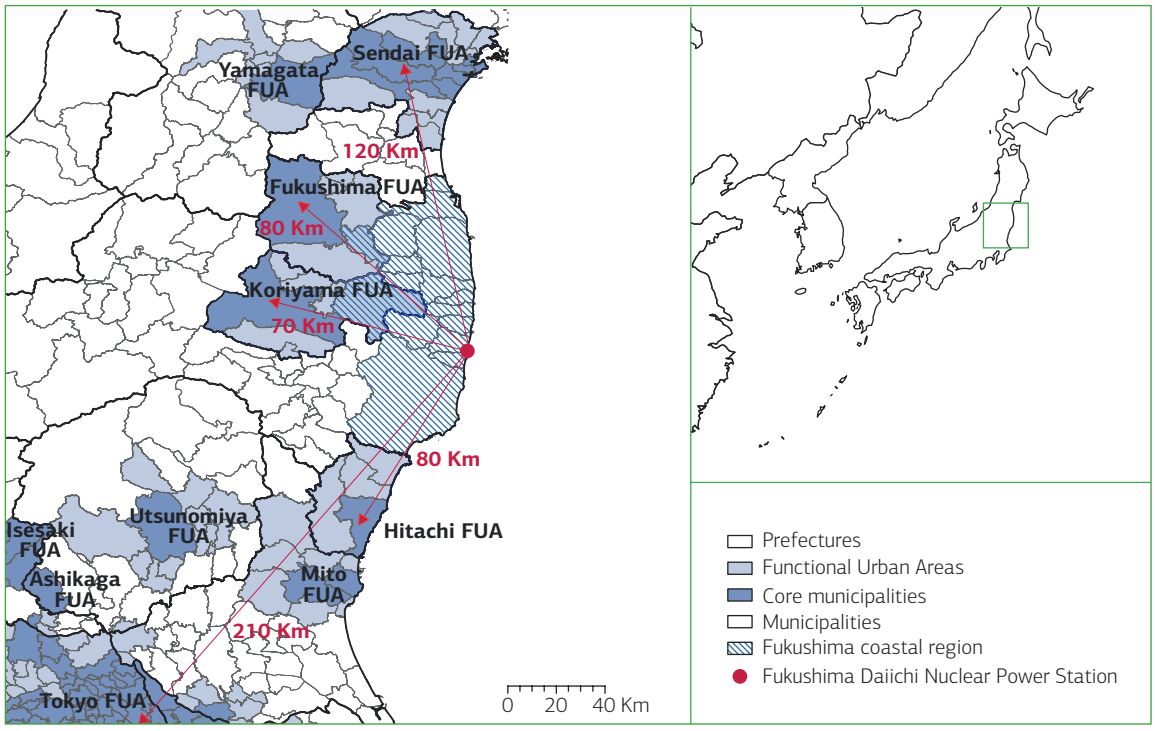
Box 4. OECD-EU definition of a Functional Urban Area

The OECD developed the definition of a Functional Urban Area (FUA) in collaboration with the European Union. Using population density and travel-to-work flows as key information, a FUA consists of a densely inhabited city and surrounding area (commuting zone) whose labour market is highly integrated with the city. The ultimate aim of the OECD-EU approach to FUAs is to create a harmonised definition both for international comparison of cities and their zones of influence, and for policy analysis on topics related to urban development.

Using FUAs allows designing policies at the right scale, for example, for mobility and accessibility to services. At the same time, FUAs provide a harmonised methodology to compare similar urban units in size and function. This is particularly relevant in the context of the Sustainable Development Goals (SDGs), a universal global agenda that requires comparability across the globe in order to track progress towards sustainable development.

Source: OECD (2012), *Redefining «Urban»: A New Way to Measure Metropolitan Areas*, OECD Publishing, Paris, doi.org/10.1787/9789264174108-en.

Functional Urban Areas around the Fukushima coastal region



Practices in other OECD regions

Case 12. Italy: The Inner Areas Strategy combines top-down approaches to identify priority targets and bottom-up efforts to engage local actors in the development process.

The Inner Areas Strategy of Italy, launched in 2014, is a national initiative to cope with development and well-being issues in regions with "inadequate access to essential services" including education, healthcare and transport. Uniquely, this strategy combines a top-down approach (for example, in the selection of regions) and a bottom-up approach that engages local actors in the whole process of development. The national government identifies and selects target regions using statistics and data. Meanwhile, co-operation between municipalities is a precondition for national and

EU funding support. In each region, communities and local governments work together to set a strategy and priorities, such as public service improvement (education, health and transport) and investment (development projects). The strategy and its elaborating process enable discussion and collaboration between mayors and communities.

Key lessons include:

- Identifying the zone/borders is critical and depends on policy objectives and goals. Scale also matters to avoid being "too small to succeed".
- Supporting/subsidising lagging regions should also focus on enhancing the region's endogenous sustainability (attractiveness, basic public service provision).
- Bringing together all relevant mayors and selecting a leader presents a challenge.

FOR MORE INFORMATION: www.enrd.ec.europa.eu/sites/enrd/files/tg_smart-villages_case-study_it.pdf and www.oecd.org/regional/Rural-WellBeing-Italy.pdf

Case 13. Sweden and Norway: Western Scandinavia shows how a region can develop collective actions and co-ordinate policies to increase the area's attractiveness.

Western Scandinavia includes 5 million inhabitants and parts of two countries. Although interaction is active across the region, traditionally there were no integrated policies. The OECD study revealed mismatches in the labour market (specialisation but no complementarity), limited cross-border connectivity, weak political will for collaboration and a lack of shared vision.

Political leadership and an understanding of the forces driving economic geography and complementarity were necessary, as were efforts by subnational governments and the private sector for better co-ordination of transport and planning across borders. Shared societal and economic activities, and values shared across the region were also prerequisite.

Best practices in Western Scandinavia include:

- The Committee for Sustainable Development between the regional government and municipalities, which decides all strategic regional development issues
- Systematic and co-ordinated dialogue between all relevant actors at the Forum for Competencies Development to improve matching in the labour market
- The Science Park System in Västra Götaland to facilitate collaboration between companies, universities, institutes and society. Six Science Parks function as an open arena and "one-stop shops". Each park specialises in areas such as sustainable transport, ICT or textiles. All parks meet regularly for co-ordination and collaboration. Thanks to the successful collaboration, investments in R&D from the business sector in Västra Götaland have become larger than those in the Stockholm region, with more than a third of all R&D from companies in Sweden made in the region in 2019.

FOR MORE INFORMATION: oe.cd/westscandi

Case 14. Germany: In Bonn, the SDGs serve as a framework to allocate resources to its development as international sustainability hub and centre for knowledge-based services.

Over the past three decades, the Federal City of Bonn changed from its role as the federal administrative capital to an international sustainability hub with a strong focus on the knowledge-based services sector, science and research. Supporting its commitment to a low-carbon economy, Bonn embraced the SDGs as a framework to institutionalise Bonn's Sustainability Strategy and allocate resources to its implementation. The SDGs provide a holistic framework to manage trade-offs between climate, sustainable mobility and affordable housing goals, while striving to promote equality of opportunities.

FOR MORE INFORMATION: oe.cd/SDGs-Bonn

Conclusion: Fukushima's progress and future prospects

Fukushima made progress since the disaster in 2011. Extensive decontamination efforts lowered radiation levels from contaminated land. As a result of intensive surveillance of radiation and contamination levels of land, food and water,[1] the government gradually lifted evacuation orders after April 2014.[2]

Thanks to a strong political commitment to promote investment and employment in the region, along with ambitious strategies, policies and programmes, economic progress is underway with the prefecture recovering steady growth in GDP. Agricultural production values recovered 90.7% of pre-disaster levels.[3] Reconstruction of river, coast, road, port and other infrastructure was 96% completed as of August 2020. The J-Village national football training centre, once a base of operations to cope with the disaster, resumed its normal function in April 2019 (see photo on Page 20) and the East Japan Railway's Joban Line, connecting Tokyo and Sendai, resumed full service in March 2020 (see photo on Page 21).

Nevertheless, challenges persist. As of March 2020, the 371 km^2 evacuation zones occupy 2.7% of Fukushima Prefecture (13 783 km^2) in seven municipalities, affecting 8 454 households and 22 332 residents.[4,5] Retaining talent and skills in the region, especially among young people, was a constant challenge even before the accident. Despite significant efforts by national and prefectural governments to demonstrate the safety of food produced in Fukushima, 14 countries and regions maintain import restrictions on Japanese food (i.e. bans or test certificate requirements), preventing Fukushima from the resumption of normal economic activities.

Going forward, stronger efforts are needed to recover the industrial base in Fukushima's coastal area and develop a foundation for long-term, sustainable growth for the region. In 2014, the government of Japan launched the Fukushima Innovation Coast Framework to promote local entrepreneurship, human resource development, and capital investment in infrastructure and R&D facilities. Two top-notch infrastructure projects, the Naraha Centre for Remote Control Technology Development and the Fukushima Robot Test Field, began full operation, making Fukushima competitive in the global robotics industry. Moreover, the Reconstruction Agency of Japan plans to set up an international education and research hub as part of a government blueprint for reconstruction of the coastal region.

Looking ahead, the goal is not only to recover, but to build a sustainable future for the region. A crucial building block is regional development beyond the decommissioning efforts. Maximising Fukushima's economic potential will require implementing a place-based approach. This means working with local communities to identify assets and priorities for investment, and effective co-ordination of stakeholders across different industries and policy areas.

1 http://radioactivity.nsr.go.jp/ja/
2 https://www.env.go.jp/en/chemi/rhm/portal/digest/dwelling/detail_001.html
3 http://www.pref.fukushima.lg.jp/uploaded/attachment/412624.pdf
4 https://www.meti.go.jp/earthquake/nuclear/hinan_history.html
5 https://www.env.go.jp/en/chemi/rhm/portal/digest/dwelling/detail_001.html

The history of Fukushima may be unique, but many of its challenges and efforts are common. Regions and cities around the world struggle to recover from natural disasters or economic turbulence. Working with communities is essential to restore inclusive and sustainable growth, and the younger generation will play a key role in doing so.

The **Organisation for Economic Co-operation and Development (OECD)** consists of 38 member countries and works to build better policies for better lives. It provides a forum where governments work together to address the economic, social and environmental challenges of globalisation. The Organisation is at the forefront of efforts to help governments understand and respond to developments and concerns such as corporate governance, the information economy and the challenges of an ageing population. Through the OECD, governments can compare policy experiences, seek answers to common problems, identify good practice and work to co-ordinate domestic and international policies.

The **OECD Centre for Entrepreneurship, SMEs, Regions and Cities (CFE)** is the Organisation's hub of excellence in the fields of SME and entrepreneurship policy; regional, urban and rural development; regional and metropolitan area statistics; multi-level governance; and tourism. CFE led the OECD-Japan Policy Dialogues on Developing Decommissioning-Industry Clusters in Fukushima based on its policy expertise in local asset-based development.

www.oecd.org/cfe/ | @OECD_local | CFECities@oecd.org

Since the immediate aftermath of the accident, the **OECD Nuclear Energy Agency** (**NEA**) has supported Japan in areas where long-term stakeholder engagement is necessary. Ongoing NEA support covers areas such as: recovery management; decommissioning and site remediation; addressing concerns about food safety; evaluating the condition of the damaged reactor cores; and developing long-term decommissioning and radioactive waste management strategies. The NEA convenes regular conferences in Fukushima Prefecture, including mentoring workshops for high-school students to learn from the experience of international nuclear engineers and scientists. The NEA will continue to assist Japan by sharing international experiences and expertise in engaging stakeholders and recovering trust and confidence in nuclear policy.

www.oecd-nea.org/ | @OECD_NEA | nea@oecd-nea.org

The **Ministry of Economy, Trade and Industry** promotes economic vitality in private companies, advances external economic relationships, and secures the stable and efficient supply of energy and mineral resources. Since the accident, the Ministry supports the decommissioning of Fukushima Daiichi Nuclear Power Station by connecting local firms with decommissioning projects and building trust among the local community. The Ministry works closely with TEPCO, Fukushima Prefecture, municipalities in the Fukushima coastal region, the Fukushima Innovation Coast Promotion Organization and Fukushima Soso Reconstruction Corporation.

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