LEARNING EXPEDITION FISHWIND · MISSION REPORT

Fisheries and offshore wind in Japan

漁業と洋上風力の共生

Coexistence, the role of cooperatives and artificial reefs: lessons from Chōshi, Tokyo and Gotō



Floater upended off Gotō before the nacelle is installed (SDI slide)

17 – 25 October 2026

MONTPELLIER · TOKYO · CHŌSHI · GOTŌ · TOKYO · MONTPELLIER

SATHOAN LA MER ENSEMBLE PAR PASSION

fishwind Pêche et éco-conception pour un avenir durable

CCI FRANCE JAPON 在日フランス商工会議所

SDI 水面下から地球を支える 渋谷潜水工業 SHIBUYA DIVING INDUSTRY

Authors: Bertrand Wendling and Nolwenn Cosnard · Final version · October 2026 · translated from the French original

FOREWORD

Acknowledgements

From 17 to 25 October 2026, a delegation from OP SATHOAN travelled to Japan to understand how Japanese fishers experience, negotiate and support the arrival of offshore wind. This trip would not have had the same reach without the commitment of our hosts.

First and foremost, this trip would never have happened without **Sylvain Pioch**. It was he who, last year, brought Mr Shibuya and Ms Hazuki Dwyer, of the company SDI, to Sète. That first meeting was the origin of everything that followed: the exchanges with SDI, the idea of this study tour and its organisation. His involvement was essential; without him, none of this would have been possible.

Our first thanks go to **Mr Shibuya** (portrait on the following page), of **Shibuya Diving Industry (SDI)**. From Chōshi to Gotō, he opened the doors of cooperatives, local authorities and worksites for us, and shared with great generosity twenty years of work under the sea alongside fishers. The book he calligraphed and dedicated to each of us, on our last evening in Gotō, will remain the defining image of this stay: that of a sincere, attentive and deeply human welcome.

We thank just as warmly **Ms Hazuki Dwyer**, Mr Shibuya's assistant at SDI, who accompanied the delegation throughout the stay, provided part of the translation and ensured, with unfailing patience, that every meeting took place in the best possible conditions.

The **French Chamber of Commerce and Industry in Japan (CCI France Japon)** designed and organised a programme of rare density. We particularly thank **Ms Faustine Tobee**, Business Services Manager, who built this programme and opened the doors of our counterparts, **Mr Mehdi Matagne**, who guided us every day, and **Ms Akiko Shioda**, our Japanese-French interpreter.

Finally, we express our gratitude to all those who took the time to receive us, explain their work and answer our questions:

Chōshi (Chiba Prefecture)
The Chōshi Fisheries Cooperative (JF Chōshi), Chōshi City, Chiba Prefecture and the young fishers we met on the quays.

Tokyo
OKABE and NBK Corporation, received at CCI France Japon, and the National Federation of Fisheries Cooperative Associations (JF Zengyoren).

Gotō (Nagasaki Prefecture)
The Gotō fisheries federation and fisheries cooperative, and Gotō City, in particular its "Zero Carbon City" team.

And our hosts each evening
For meals where we talked about fish, the sea and the future, well beyond the meetings.

This report is our way of continuing these exchanges. It brings together what we saw and heard, the documents provided by our counterparts and our own analysis, with one objective: to inform reflection on the coexistence of fishing and floating offshore wind in the Mediterranean, and to lay the foundations for lasting cooperation between France and Japan.

Bertrand Wendling
Chief Executive Officer, OP SATHOAN

Nolwenn Cosnard
Project Officer, environmental projects coordination, OP SATHOAN

Report written by Bertrand Wendling and Nolwenn Cosnard, on behalf of the OP SATHOAN delegation.

HOW TO READ THIS REPORT

The information comes from discussions on site (notes taken during the stay), documents provided and photographed slides. Japanese figures are reproduced as they were presented; calculations added by the delegation are indicated. Yen amounts are converted into euros at the indicative rate of **€1 ≈ ¥185** (ECB reference rate, June 2026) and rounded. Points that remain to be confirmed with our counterparts or by document are indicated by a numbered note at the end of the section; additional information to be collected is summarised in Annex D.

PORTRAIT

Masanobu Shibuya, a diver serving the sea and fishers

Founder of Shibuya Diving Industry (SDI), our host from Chōshi to Gotō has devoted fifty years to the sea, first by transforming it, then by repairing it alongside fishers.

Born in 1949 in Kushiro (Hokkaido), Masanobu Shibuya left a stable job in industry to become a professional diver, qualifying in 1973. For nearly twenty years, he worked on Japan's major maritime construction projects, from the Yokohama Bay Bridge to the Tokyo Bay Aqua-Line.

In the late 1980s, he realised that his work was damaging the seabed he loved. A school of black sea bream observed at the Kawasaki artificial island showed him that a structure at sea can also become a habitat. He made this the thread of his life: building in harmony with the sea, restoring underwater forests, and training divers who regard the sea as their true client.

He has logged around 40,000 hours of diving over fifty years. Since the 2000s, he has studied and restored more than 70 fishing grounds and seaweed beds across Japan, always alongside fishers. In Gotō, his dives beneath the floating demonstration turbine showed initially worried fishers what the structure was becoming underwater. In Chōshi, he is supporting the cooperative in trialling reefs around the wind turbine.

His work has been featured by NHK and TBS, and he has recorded it in two books devoted to offshore wind that coexists and thrives with fishing and local communities.

> *Build in harmony with the sea, and regard the sea as your true client.*



Mr Shibuya in diving suit, helmet in hand, in front of an SDI underwater robot (ROV).



Off Gotō, in front of the floating wind turbine whose transformation into a reef he has followed.



Brush-written dedication of his book for each member of the delegation, at Tsubaki Chaya, on 23 October 2026.

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SUMMARY

What we bring back from Japan

In seven days, the delegation met fishers, cooperatives, local authorities, underwater works companies and the national federation of fisheries cooperatives. Everywhere, the same message: in Japan, **no offshore wind farm goes ahead without the fishers**. But behind this principle, we above all discovered concrete tools, and limits.

2 tiers
The fishers' safeguard: a criterion in the law, prior agreement in the government's policy guidelines

20 years
Duration of the Gotō fisheries support fund, financed by the project company since 2024

2014
Creation of the Gotō consultation council, five years before the zone was designated (2019)

8 + 1
Floating wind turbines in Gotō: the commercial wind farm and the 2 MW demonstrator

223,994 t
Landed in Chōshi in 2025, Japan's leading port by volume

3%
Market commission collected by the Chōshi cooperative, which runs the fish auction itself

37%
Share of Gotō and prefecture companies in the works for the floating wind farm (2018-2025)

16,000+
"JF Shellnurse" shell reefs installed in Japan, whose substrates are made by fishers

Ten lessons

01 **The fishers' "right of veto" rests on two tiers.** The 2019 law prohibits designating a zone if fishing is likely to be hindered and makes fishers' organisations ex officio members of the consultation committee. Fishers' prior agreement, however, appears in the government's policy guidelines. It is robust in practice, but it is not a veto written into law.

02 **Consultation begins before zones are designated.** In Gotō, the local council has existed since 2014 and its fisheries working group since 2015; the zone was only designated in 2019. JF Zengyoren is asking for discussions to take place even before classification as a "candidate zone".

03 **Cooperatives are economic actors before they are political actors.** They manage coastal fishing rights, run fish auctions, and supply ice, fuel, credit and insurance. Their weight in negotiations stems from this.

04 **Compensation is negotiated locally and over the long term.** In Gotō, the project company finances for 20 years a municipal fisheries support fund, managed with the three cooperatives; its first measure covers part of vessel insurance costs.

05 **Local benefits depend on where construction takes place.** In Gotō, manufacturing the concrete floaters at the port generated most of the local employment; the offshore works remained with outside companies.

06 **Every local stakeholder receives a tool.** Gotō created a citizens' fund, a citizen-owned electricity company, an "RE100" label run by the chamber of commerce, a visitor programme (nearly 14,000 visitors), and had the wind turbines named by schoolchildren.

07 **Coexistence can be entrusted to dedicated structures.** In Chōshi, the cooperative, the chamber of commerce and the city created a coexistence centre and an offshore wind services company.

08 **The wind turbine can become a habitat.** In Chōshi, reefs are placed at the foot of a fixed-bottom turbine; in Gotō, the floater itself, painted to encourage the settlement of organisms, is colonised by seaweed and fish down to 76 m depth. Transposing this to French floaters, however, comes up against technical constraints.

09 **Encouraging results, to be consolidated together.** The observations presented by SDI (spiny lobsters in Chōshi, comparative fishing in Gotō) are very encouraging and have convinced the fishers. To use them in the French debate, they will need to be complemented by a baseline survey and comparison sites. SDI itself stresses this need, but has not always been able to carry out a baseline survey, for lack of agreement from the project developer.

10 **Artificial reefs are a mature industry in Japan.** Manufacturers, a national federation acting as distributor, multiple public programmes and fishers involved in manufacturing: a model directly useful for active restoration projects (FISHWIND, RESTOR, BRESTOR).

AVENUES FOR REFLECTION

- **Making fishers actors in co-construction.** This is the main lesson of the stay. In Japan, the sea is seen as a space for production, economic activity and employment, not merely as an area to be protected or shared. Cooperatives and fishers' organisations are fully fledged actors: they negotiate, lead projects, manage funds and take part in monitoring. Fishers are actors in their own development. In this context, wind projects are generally perceived positively, even if obstacles exist in certain sectors, and artificial reefs are a common technique, applied in a very practical way, even though few scientific studies were presented to us. This is the major difference with the French situation, and the first avenue for reflection for FISHWIND: giving fishers' organisations a partner's role in the design of wind farms.
- **Compensation for fishing on the AO6 and AO10 wind farms.** In France, each offshore wind farm pays an annual tax of around €19,900 per installed megawatt (2024 value), i.e. nearly €5 M per year for a 250 MW wind farm. For wind farms located in the territorial sea, 35% of this tax already goes to the fisheries committees. The AO6 and AO10 wind farms are located beyond it, in the exclusive economic zone (EEZ), where the tax revenue currently goes to the State budget. How fishing could benefit from it remains to be worked out; the Gotō fund, managed with fishers throughout the operating life, is an example worth studying.
- **Habitats around the wind farms, rather than on the structures.** Attaching reefs directly to floaters or moorings would be ideal, but energy companies point to constraints of excess weight, current drag and hydrodynamics. The most realistic options are reefs placed within the footprint of the wind farms, where towed gear is excluded, and on cable protections.
- **Access for line fisheries and local benefits.** The fish aggregation effect observed in Gotō would benefit line fishers if fishing remains possible near the turbines. Manufacturing, assembly and maintenance in the ports of the Gulf of Lion are the other lever for local benefits.
- **For active restoration projects (FISHWIND, RESTOR, BRESTOR)**: draw inspiration from Japanese models (shell reefs, small modules placed by fishers, hijiki restoration), with a baseline survey and a scientific protocol from the outset.
- **For France-Japan cooperation**: host Mr Shibuya in France, at sea and with fishers, and formalise a partnership between SDI and SATHOAN.

出張

1

The trip

Objectives, organisation, itinerary and logistics of the FISHWIND Learning Expedition.

1 · THE TRIP

Objectives and organisation

The Learning Expedition is part of the **FISHWIND** project, dedicated to the coexistence of fishing and floating offshore wind in the Mediterranean and to the potential installation of artificial reefs across all future commercial wind farms (AO6 and AO10). Its question: how can fishers coexist with these wind farms, and under what conditions? Japan offered a unique field of observation, with a recent legal framework, powerful cooperatives and the country's first commercial floating offshore wind farm.

THE MISSION'S OBJECTIVES

- Understand Japan's **legal framework** for offshore wind and the place it gives to fishers.
- Gauge the **weight of cooperatives** in decisions and negotiations.
- Observe a **floating offshore wind farm in operation** (Gotō), the case closest to the commercial floating wind farms planned in the French Mediterranean (AO6 and AO10).
- Document the **compensation** obtained by fishing and the benefits for the territory.
- Study **artificial reefs** and seabed restoration, in connection with the active restoration projects (FISHWIND, RESTOR, BRESTOR) led by SATHOAN.
- Build lasting **partnerships** with Japanese stakeholders.

A THREE-PARTY ORGANISATION

- **The OP SATHOAN delegation** (Sète), a producer organisation representing Mediterranean artisanal and coastal fleets: five people, including two professional fishers (see below).
- **CCI France Japon** built the programme and arranged the institutional meetings (Ms Faustine Tobee, Business Development), and provided daily support (Mr Mehdi Matagne) and Japanese-French interpreting (Ms Akiko Shioda).
- **Shibuya Diving Industry (SDI)**, a Japanese underwater works and survey company and long-standing partner of fishers, hosted the delegation in Chōshi and Gotō, offered several meals and provided part of the translation (Ms Hazuki Dwyer).

> **SDI AT A GLANCE**
>
> Shibuya Diving Industry Co. 渋谷潜水工業, slogan "Supporting the Earth from beneath the surface". Assessment and restoration of fishing grounds at more than 70 sites in Japan, including Chōshi and Gotō; underwater monitoring of offshore wind turbines; "marine energy-fisheries coexistence centre".

The OP SATHOAN delegation

Name	Position
Vincent Scotto	President of OP SATHOAN, professional fisher (trawl)
Bertrand Wendling	Chief Executive Officer of OP SATHOAN
Renaud Frejafond	Board member of OP SATHOAN, bluefin tuna longline fisher
Christine Segorb	Deputy Director, OP SATHOAN
Nolwenn Cosnard	Project Officer, environmental projects coordination, OP SATHOAN

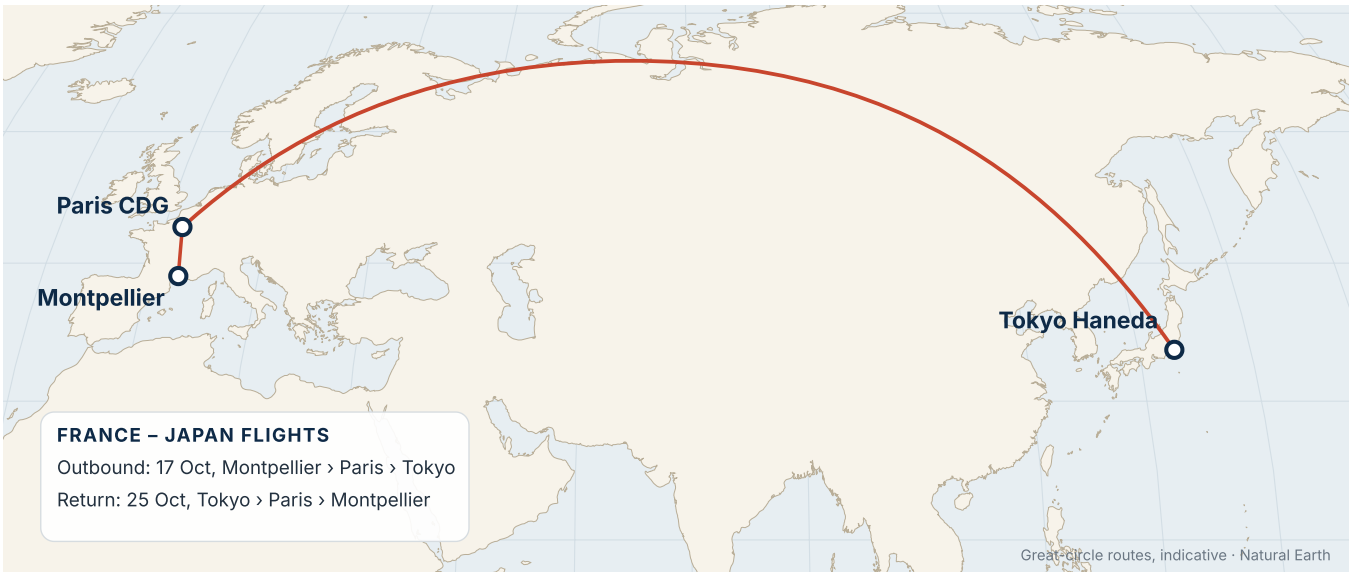
Three stages, three scales

Stage	Dates	What it contributes
Chōshi Chiba Prefecture	19-20 October	Japan's leading port by volume, a fixed-bottom offshore wind turbine and a commercial wind farm project; a cooperative that runs the fish auction; experimental reefs around the wind turbine.
Tokyo national scale	21 October	The artificial reef manufacturers (OKABE, JF Shellnurse) and the national federation of cooperatives (JF Zengyoren), which negotiated the offshore wind law.
Gotō Nagasaki Prefecture	22-23 October	Japan's first commercial floating offshore wind farm, consultation under way since 2014, a 20-year fisheries support fund and quantified local benefits.

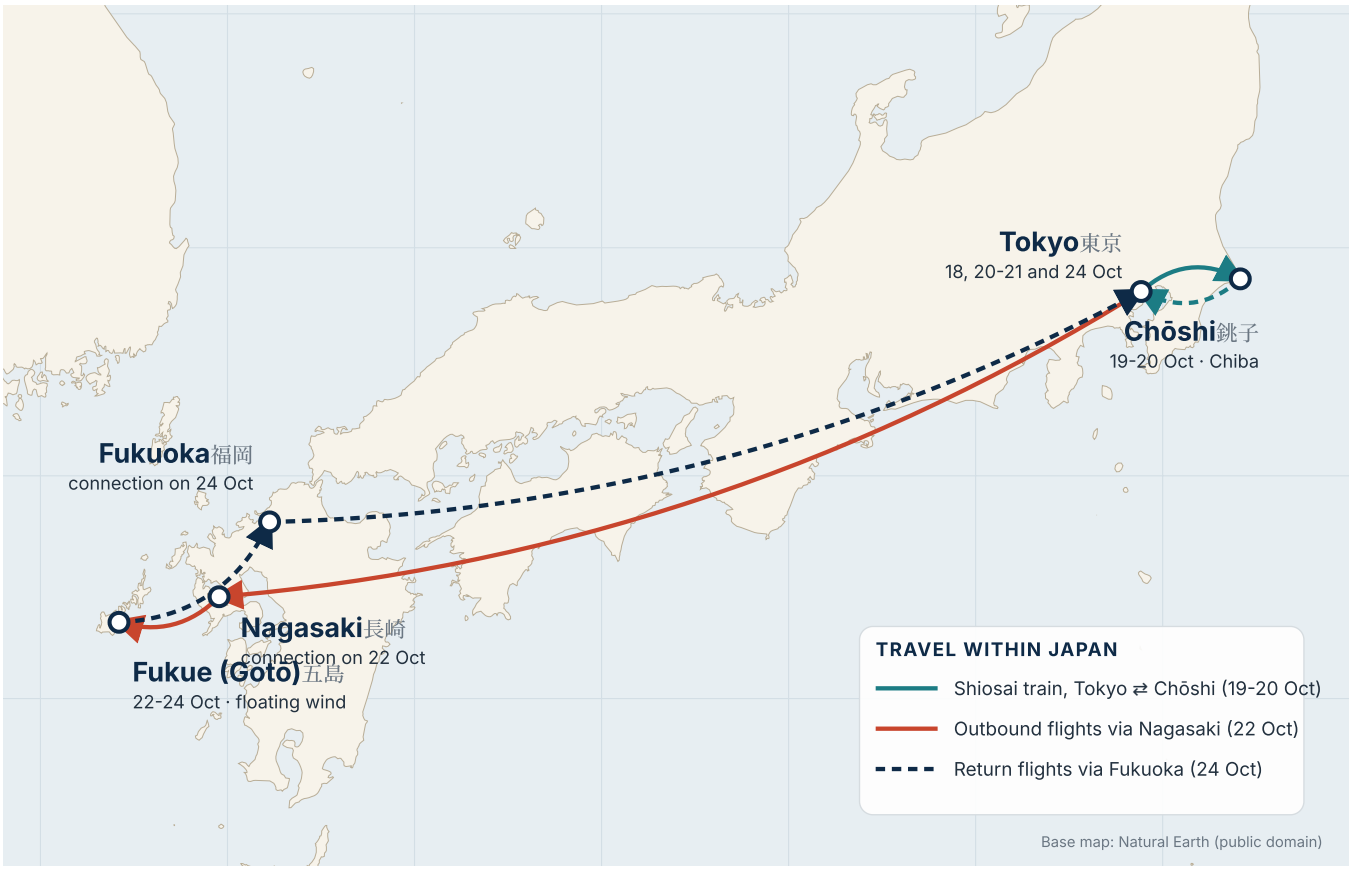
1 · THE TRIP

Programme and itinerary

The delegation travelled more than 20,000 km by air between France and Japan (return trip), then around 2,500 km within Japan, by train to Chōshi and by air to the Gotō archipelago, in the far west of the country.



Map 1 · Connections between France and Japan. Outbound on 17 October, return overnight from 24 to 25 October.



Map 2 · Travel within Japan. Tokyo serves as the base; Chōshi is reached by train (around 2 h), Gotō by two connecting flights via Nagasaki on the way out and via Fukuoka on the way back.

1 · THE TRIP

The programme day by day

Day	Stage	Main meetings
Sat 17	Montpellier › Tokyo	Flights Montpellier › Paris CDG › Tokyo Haneda
Sun 18 · Day 1	Tokyo	Arrival at Haneda at 06:26, check-in at the Shinagawa Prince Hotel, free day
Mon 19 · Day 2	Tokyo › Chōshi	Shiosai train; lunch with SDI; meeting with Chiba Prefecture and Chōshi City; Chōshi Fisheries Cooperative; dinner with the cooperative
Tue 20 · Day 3	Chōshi › Tokyo	Fish market (hall no. 3); further discussions with the cooperative; return to Tokyo; free afternoon
Wed 21 · Day 4	Tokyo	OKABE (artificial reefs), SDI and NBK Corporation at CCI France Japon; lunch with CCIFJ; JF Zengyoren

Day	Stage	Main meetings
Thu 22 · Day 5	Tokyo › Gotō	Flights via Nagasaki; Gotō Federation of Fisheries Cooperatives; dinner with the federation
Fri 23 · Day 6	Gotō	Boat trip cancelled (typhoon) and visit to the cable landfall point; Gotō city hall; Gotō Fisheries Cooperative; SDI presentations; farewell dinner with SDI
Sat 24 · Day 7	Gotō › Tokyo	Flights via Fukuoka; free afternoon; departure from Haneda at midnight
Sun 25	Tokyo › Montpellier	Flights Tokyo › Paris CDG › Montpellier, arrival at 10:40

1 · THE TRIP

Logistics and counterparts

TRANSPORT

Date	Mode	Route	Times (local time)
Sat 17 Oct	Plane	Montpellier › Paris CDG	06:00 › 07:35
Sat 17 Oct	Plane	Paris CDG › Tokyo Haneda	10:10 › 06:26 (on the 18th)
Mon 19 Oct	Train	Tokyo › Chōshi (Shiosai-3)	10:10 › 12:00
Tue 20 Oct	Train	Chōshi › Tokyo (Shiosai-12)	12:22 › 14:07
Thu 22 Oct	Plane	Tokyo Haneda › Nagasaki (NH663)	10:55 › 12:50
Thu 22 Oct	Plane	Nagasaki › Fukue, Gotō (NH4675)	13:20 › 13:50
Sat 24 Oct	Plane	Fukue › Fukuoka (NH4914)	09:35 › 10:20
Sat 24 Oct	Plane	Fukuoka › Tokyo Haneda (NH248)	10:50 › 12:35
Sun 25 Oct	Plane	Tokyo Haneda › Paris CDG	00:05 › 07:00
Sun 25 Oct	Plane	Paris CDG › Montpellier	09:15 › 10:40

ACCOMMODATION

City	Hotel	Nights
Tokyo	Shinagawa Prince Hotel	18, 20, 21 Oct
Chōshi	Route-Inn Chōshi Eki Nishi	19 Oct
Gotō	Goto Conkana Kingdom (Winery & Resort)	22, 23 Oct

SUPPORT

Role	Person
CCIFJ programme	Ms Faustine Tobee
CCIFJ guide	Mr Mehdi Matagne
Japanese-French interpreter	Ms Akiko Shioda (19 and 21 Oct)
SDI, assistant to Mr Shibuya, Japanese-English translation	Ms Hazuki Dwyer
SDI, host	Mr Shibuya

COUNTERPARTS AT A GLANCE

Category	Organisations met
FISHERIES	Chōshi Fisheries Cooperative (JF Chōshi); JF Zengyoren (national federation); Gotō Federation of Fisheries Cooperatives; Gotō Fisheries Cooperative; young fishers of Chōshi and Gotō
LOCAL AUTHORITIES	Chiba Prefecture (carbon neutrality, fisheries, Chōshi fisheries office); Chōshi City (deputy mayor, renewable energy, fisheries); Gotō City ("Zero Carbon City" team)
COMPANIES	Shibuya Diving Industry (SDI); OKABE Co. (Marine division, reefs); NBK Corporation (trade and development assistance)
ORGANISATION	CCI France Japon

The list of counterparts by name is given in Annex A.

日誌

2

The visit day by day

An account of the meetings, from Chōshi to Gotō, with what each day taught us.

Day 0 · Day 1
17–18
OCTOBER

Departure from Montpellier and arrival in Tokyo

Montpellier › Paris CDG › Tokyo Haneda · Shinagawa Prince Hotel

Sat 17 Departure from Montpellier at 06:00, connection at Paris CDG, 10:10 flight to Tokyo Haneda.

Sun 18 Arrival at Haneda at 06:26 (local time). Keikyu Airport Line to Shinagawa station, check-in at the Shinagawa Prince Hotel. Free day spent recovering from jet lag.

Day 2
19
OCTOBER

Chōshi, Japan's leading fishing port

Tokyo › Chōshi (Chiba prefecture) · SDI, public authorities, fisheries cooperative · Route-Inn Chōshi Eki Nishi

10:10 Shiosai-3 train from Tokyo to Chōshi, arriving at noon; welcomed by the interpreter, Ms Akiko Shioda.

12:45 **Lunch with SDI** at the Kimigahama Bay House, on the ocean front. The delegation presented an illustrated SATHOAN bag ("From the sea the legend is born").

15:00 **Meeting with Chiba prefecture and Chōshi city** on relations between offshore wind and fisheries.

16:15 **Chōshi Fisheries Cooperative** (JF Chōshi): visit and discussions with the vice-president, the director general and the board members.

18:30 **Dinner with the cooperative** at the Itô restaurant, hosted by SDI: tatami banquet room, some twenty guests, simmered splendid alfonsino (金目鯛, kinmedai), a Chōshi speciality.

SDI: A BUSINESS MODEL WITH TWO TYPES OF CLIENT

SDI works at more than 70 sites in Japan, assessing the condition of fishing grounds and restoring the seabed, notably reefs. Its whiteboard diagram shows that habitats and restoration are commissioned either by **power utilities and wind developers**, or by **local authorities**, directly or through the **fisheries cooperative**, which can lead the project. Habitat funding therefore comes from the developer or the local authority.



More than 70 fishing-ground survey and restoration sites across Japan, including Chōshi and Gotō (SDI slide).

WHAT THE AUTHORITIES SAY

Chōshi has one fixed-bottom offshore wind turbine and is planning a commercial wind farm close to the coast; there is no floating offshore wind. The national map presented classifies zones into three categories: **promotion zones** (促進区域), **candidate zones** (有望区域, literally "promising") and **zones in preparation** (準備区域). Chōshi is in a promotion zone. The central message: the law created a **consultation council** (協議会, kyōgikai) bringing together fishers, local authorities and other stakeholders, and no project goes ahead without their agreement.[1]



Dinner at the Itô restaurant. Mr Shibuya (SDI) gives the welcome speech, translated into English by his assistant, Ms Hazuki Dwyer.



The banquet table on tatami: simmered splendid alfonsino, sashimi, scallop gratin.



Group photo in Chōshi with representatives of the fisheries cooperative, the city and the prefecture, Mr Shibuya and Ms Dwyer (SDI).

KEY POINTS FROM 19 OCTOBER

- Funding for reefs and habitats can come from the **wind developer** or the local authority, with the cooperative as a possible project owner.
- Authorities and fishers say the same thing: consultation is the precondition for any project.

[1] To be confirmed: current status of the Chōshi wind farm project, whose winning consortium reportedly withdrew in 2025.

Day 3
20
OCTOBER

Fish auction, vessels and young fishers of Chōshi

Fish market · Chōshi cooperative · train back to Tokyo

08:00 **Fish market**: sales hall No. 3, the newest and largest, equipped for electronic sales. Official sales method: tender bidding (入札).

— Visit to a trawler and to a vessel landing around **100 tonnes of fresh sardines**, with a few sharks as by-catch, including a hammerhead. Sardine dominates Chōshi's landings, but the fish auction also sells mackerel, saury, tuna, horse mackerel, anchovy, splendid alfonsino, sea bream, bonito and marlin (chart 1).

09:30 **Further discussions with the cooperative**: how it operates, its funding, entry of new fishers; meeting with young fishers on the quayside.

— View of the fixed-bottom turbine offshore, in rough seas.

12:22 Shiosai-12 train to Tokyo, arriving at 14:07; free afternoon.

HOW THE COOPERATIVE WORKS

- **It operates the fish auction** and acts there as sales agent. It is funded by a **3% market commission** (市場手数料).
- **It advances cash flow**: the vessel owner is paid on day 4, the buyer pays on day 9.
- **It redistributes State aid** to fishers.[2]
- **It controls entry into the profession**: new members are co-opted, preferably from Chōshi and motivated. In Japan, cooperatives manage coastal fishing rights; co-optation therefore amounts to controlling access to the resource.

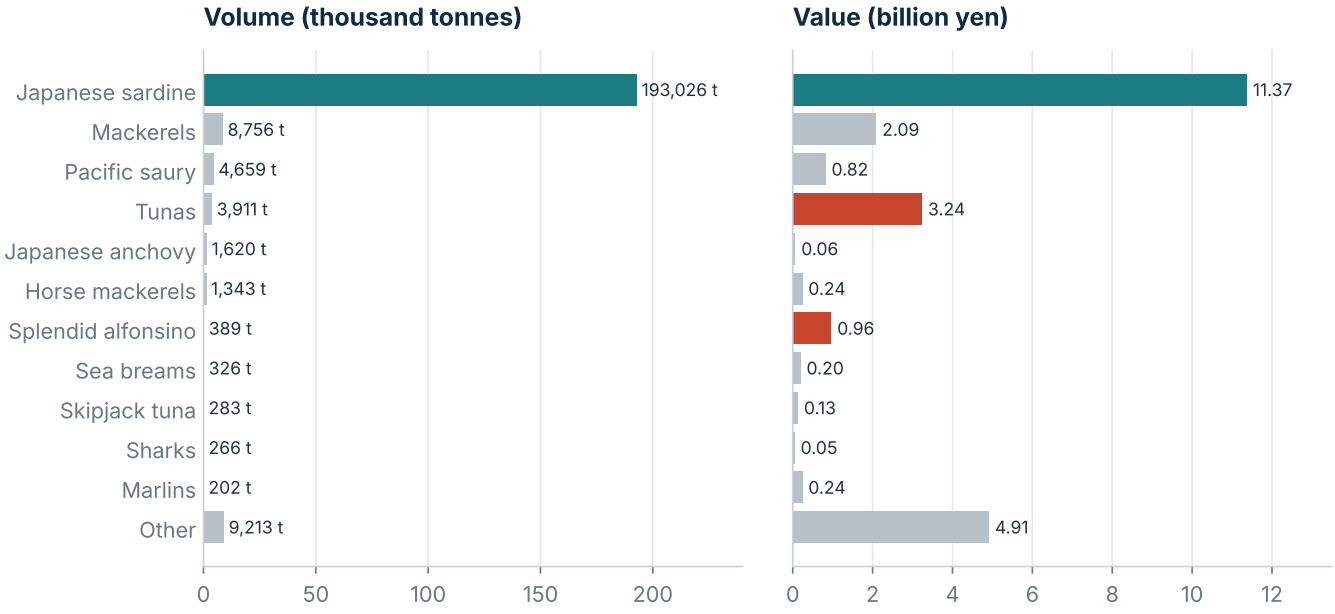


Chart 1 · Landings at Chōshi in 2025 by species. Sardine provides the volume; tuna and line-caught splendid alfonsino account for a share of value out of all proportion to their tonnage. Source: JF Chōshi 2026 brochure. Value: ¥1 bn ≈ €5.4 m.



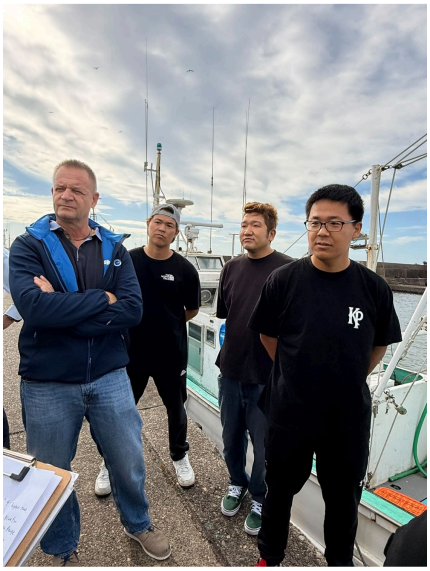
Fishing vessel at the quay in the port of Chōshi.

CHŌSHI'S REAL WEIGHT

223,994 t landed in 2025: Japan's leading port by volume but 6th by value. **81% of the volume comes from outside vessels**, mainly sardine purse seiners. The cooperative's weight rests less on its own fleet than on its role: fish auction, access to fishing, consultation. Details in Part 3.3.

AN IDEA TO FOLLOW UP: "FRESH TUNA" AS A TOURISM PRODUCT

A JR East poster advertises, for 14 November 2026, a special Tokyo-Chōshi train excursion devoted to "never frozen" fresh tuna (¥22,000 (≈ €119) per adult): lunch, filleting demonstration, sales, Chōshi drums. A direct parallel with the "Thon Rouge de Ligne" tour.



Young fishers of Chōshi on the quayside, with a member of the delegation.

CHŌSHI SPLENDID ALFONSINO: MANAGEMENT BY THE FISHERS THEMSELVES

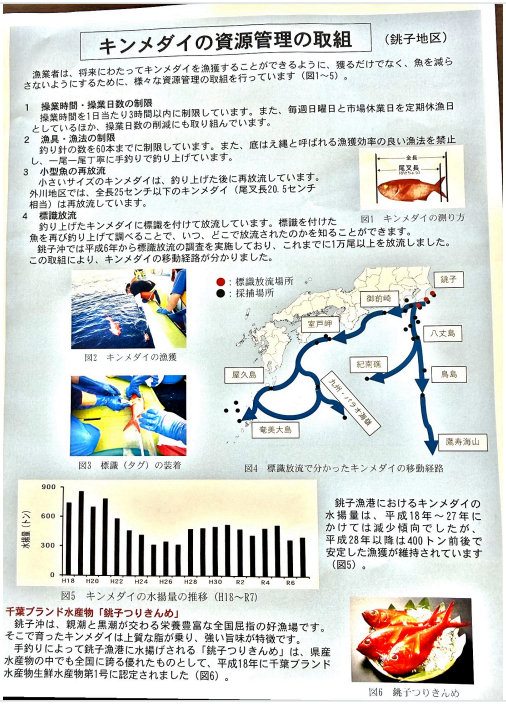
Document provided by the cooperative (Chōshi sector):

- **Limited effort**: a maximum of 3 hours' fishing per day; no fishing on Sundays or on days when the fish auction is closed.
- **Limited gear**: a maximum of 60 hooks; bottom longline banned, hand-line fishing only.
- **Release of small fish**: at Tokawa, splendid alfonsino under 25 cm (total length) are released.
- **Tagging**: more than 10,000 splendid alfonsino tagged and released since 1994, revealing their migrations towards south-western Japan.
- **Result**: after a decline between 2006 and 2015, landings have been stable at around 400 t since 2016.
- **Brand**: "Chōshi Tsuri-kinme", the first fresh product certified as a "Chiba brand", in 2006.

A direct parallel with the management of tuna line fishing in the Mediterranean.

RISING COSTS, POSTED AT THE COOPERATIVE

On 1 November 2026, ice rises by about 18% (a block from ¥1,700 to ¥2,000, i.e. ≈ €9 to €11; 100 kg of crushed ice from ¥1,275 to ¥1,500, i.e. ≈ €7 to €8), owing to the cost of electricity. Boots, oilskins, gloves and propeller anodes have risen by 5 to 30% since September. Japanese fishers face the same cost crisis as Mediterranean fishers.



"Managing the splendid alfonsino resource", a Chōshi cooperative document: effort limits, release, tagging, landings since 2006 and the "Chōshi Tsuri-kinme" brand.

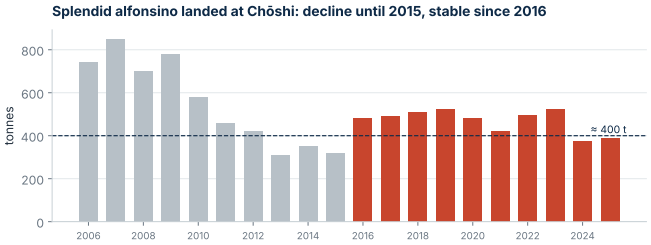


Chart 2 · Splendid alfonsino landings at Chōshi, 2006-2025, in tonnes. French version of the cooperative's chart (values read from the document, except 2025: 389 t).

TRANSLATION OF THE KEY POINTS

Fishing time limited to 3 h per day, rest on Sundays and on days when the fish auction is closed; a maximum of 60 hooks and bottom longline banned; splendid alfonsino under 25 cm released; more than 10,000 fish tagged since 1994; "Chōshi Tsuri-kinme" brand since 2006.

KEY POINTS FROM 20 OCTOBER

- The cooperative is an **integrated economic operator** (fish auction, cash flow, ice, fuel), funded by 3% of sales.
- Co-opting new fishers makes the cooperative the **gatekeeper of access to the sea**, hence its weight in dealings with developers.

[2] To be confirmed: nature of the State aid redistributed.

Day 4
21
OCTOBER

Tokyo: artificial reefs and the national federation

CCI France Japon · OKABE, SDI, NBK Corporation · JF Zengyoren

10:00 **OKABE and NBK Corporation at the French Chamber of Commerce and Industry in Japan (CCI France Japon)**, with SDI: more than two hours of discussions on artificial reefs.

12:30 Lunch with CCI France Japon (Coredo Muromachi).

14:00 **JF Zengyoren**, the National Federation of Fisheries Cooperative Associations of Japan: nine counterparts, including the chairman of the board of representatives, Mr Masanobu Sakamoto, and the executive director general, Mr Shuichi Uchida.

OKABE: A RANGE OF REEFS FROM ONE KILOGRAM TO TENS OF TONNES

OKABE Co. (岡部株式会社) is a construction company whose Marine division designs and installs reefs for demersal and pelagic species, fish aggregating devices (FADs) and reefs for seaweed cultivation. It relies on a research body dedicated to seaweed and also works internationally, notably in the Dominican Republic on FADs. In Japan, reefs are mainly funded by the State, together with prefectures and cooperatives.[3]

NBK Corporation (南洋貿易, founded in 1893) is a trading and official development assistance projects company, active in the Pacific islands, Asia, the Caribbean and Africa.[4]

JF ZENGYOREN: THE FEDERATION THAT NEGOTIATED THE LAW

The federation presented to us, in French, the history of the law on the use of maritime zones for renewable energy. On 20 February 2018, before the bill was examined, JF submitted **six written requests** to parliamentarians of the ruling majority, then tracked, request by request, the provision obtained. It is also the national distributor of **JF Shellnurse shell reefs** and of the small Kaiso-kun module, whose substrates are filled by the fishers themselves. Detailed analysis in Parts 3.1 and 3.5.



At CCI France Japon, with OKABE, NBK Corporation and SDI. On the table, the Japanese and French flags and the FISHWIND brochure.



At JF Zengyoren headquarters, the delegation with its counterparts and Mr Shibuya.

KEY POINTS FROM 21 OCTOBER

- JF's method is as instructive as its result: **written requests before the vote**, followed by point-by-point monitoring.
- Artificial reefs are an **industrial sector**, with multiple sources of public funding and a fisheries federation acting as distributor.
- JF itself acknowledges that knowledge of the impacts of offshore wind on fisheries remains limited.

[3] To be confirmed: public programme, funding rate and project owner.

[4] To be confirmed: link between NBK and OKABE's FAD activity in the Caribbean.

Day 5
22
OCTOBER

Arrival in Gotō: fishers facing floating offshore wind

Tokyo › Nagasaki › Fukue · Federation of Gotō Fisheries Cooperatives · Goto Conkana Kingdom

- **10:55** Flight from Tokyo Haneda › Nagasaki, then 13:20 Nagasaki › Fukue, the main island of the Gotō archipelago.
- **15:00** **Federation of Gotō Fisheries Cooperatives** (Fukue), with SDI: meeting in a traditional room, with fishers from several generations.
- **18:00** Dinner at the hotel restaurant, hosted by SDI: yellowtail carpaccio, sashimi, small grilled fish, individual hotpot.

WHAT THE FISHERS SHOWED US

- **A wind farm of 9 floating turbines** off Gotō, according to the fishers: 8 machines in a line east of Fukue, plus the 2 MW demonstrator ("Haenkaze"). A hand-annotated wall-mounted nautical chart gives the name of each machine.
- **A diagram of a "spar"-type turbine**: at the surface, a 40 m footprint around the tower, i.e. the rotor radius; on the seabed, catenary mooring lines extending 300 to 400 m from the tower, i.e. a footprint 600 to 800 m in diameter per machine.
- **Snagged gear is not a source of concern**: if fishing gear gets caught on a turbine or its moorings, the fishers cut it. The issue raises no particular concern, as fishers remain very cautious near the machines.
- **The same message as in Chōshi and Tokyo**: installation is only possible with the agreement of the fishers, who negotiated several points.[5]

THE REAL ISSUE FOR TOWED GEAR: THE SEABED FOOTPRINT

40 m at the surface, but a 300 to 400 m radius on the seabed for each turbine: for a line of 8 machines, the mooring area covers several kilometres. For floating wind farms in the Mediterranean, this is the figure that must be cross-referenced with HALIOP tracks of trawlers and netters.[6]



Meeting with the Gotō fishers. Mr Shibuya supports his explanations with sketches, translated into English by Ms Hazuki Dwyer; on the table, the zone map; a camera films the exchange.



Dinner on 22 October at the hotel restaurant, hosted by Mr Shibuya.

KEY POINTS FROM 22 OCTOBER

- Gotō is the only case in the mission where **floating offshore wind is in operation**: the closest to the Gulf of Lion.
- The disruption is minor at the surface for line fisheries; it is real on the seabed for towed and set gear.

[5] To be confirmed: exact content of the points negotiated.

[6] To be confirmed: types of floaters and mooring lengths selected for the AO6 and AO10 wind farms.

Day 6
23
OCTOBER

Gotō: port, city hall, cooperative and SDI

Port of Fukue · Gotō City · Gotō fisheries cooperative · farewell dinner at Tsubaki Chaya

10:00 **Sea trip cancelled**: the visit to the floating turbines by water taxi could not take place, owing to poor weather conditions linked to the passage of **typhoon No. 30 Champi** (台風30号チャンパー) south of Gotō[7]. The delegation took the opportunity to visit the coast at the **cable landfall** connecting the wind farm to shore, then the port in heavy rain: coastal boats, trolling lures, spiny lobster nets.

11:30 Lunch at the Shinsei restaurant.

13:30 **Gotō city hall**, renewable energy officer, then the **Gotō fisheries cooperative** at 14:40, at the port of Fukue (Terminal 2).

— **SDI presentations** on Chōshi and Gotō: experimental reefs, floater-reefs, comparative fishing, hijiki restoration.

18:00 **Farewell dinner with SDI** at the Tsubaki Chaya, around a long charcoal hearth (irori); Mr Shibuya gives each guest a book with a brush-written dedication.



Port of Fukue. Coastal boat in the rain.



Japanese spiny lobsters (伊勢海老) caught with set nets.



Trolling lures with feathers and mother-of-pearl bodies.

SDI'S BASE IN GOTŌ: THE "MARINE ENERGY-FISHERIES COEXISTENCE CENTRE"

SDI has its own building in Fukue, the **marine energy-fisheries coexistence centre** (海洋エネルギー漁業共生センター), which presents its activities on the island: underwater monitoring of the turbines by divers, aerial drones and underwater drones (ROVs), training of professional divers "in coexistence with fisheries" since 2016, educational activities with schools, and multi-year monitoring of the Sakiyama hijiki (panels from 2017 to 2024). One panel lists the species held responsible for isoyake: herbivorous fish (*Kyphosus*, *Siganus*, parrotfish) and the diadema sea urchin.



SDI's building in Gotō, in the rain.



Exhibition room: ROV, drone, underwater videos, diagram of a floating offshore wind turbine "in coexistence with fisheries".



Diving equipment and photos of the diver training (2016).



Panels on the Sakiyama hijiki, year by year, and awards from 2018 and 2019.

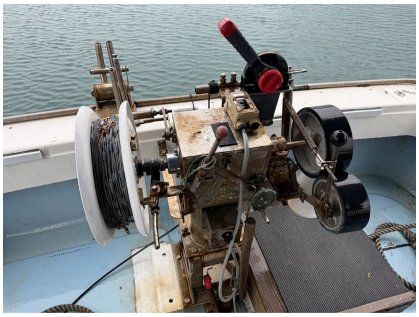


SDI professional diving equipment and panel on the species responsible for isoyake.

ON BOARD A GOTŌ FISHING BOAT



Wheelhouse: echo sounders and plotter, two line winches.



Line hauler and weighted-line drum.



Feather lures for trolling.

THE WIND FARM'S CABLE LANDFALL

In the absence of a sea trip, the delegation saw the coast where the export cable of the floating offshore wind farm comes ashore. The cable is laid directly on the basalt seabed and protected by a **concrete casing** from the shore until the depth exceeds 5 m. Beyond that, it rests on the seabed. A simple solution, suited to a rocky coastline, and a useful point of comparison for the landfalls of Mediterranean wind farms, where the seabed and the uses of the coastal strip are different.

THE MESSAGE FROM THE CITY HALL AND THE FISHERS

Representatives of the city and of the fishers describe **extremely significant** benefits in terms of employment, training and awareness-raising. They stress one point: nothing would have been possible without **substantial co-construction work with fishing professionals**. The city's presentation provides the evidence: a consultation council set up in 2014, a 20-year fisheries support fund, and quantified jobs and tax revenues. Full analysis in Part 3.4.



Meeting at the port of Fukue, in the late afternoon: the delegation and its Japanese counterparts.



Farewell dinner at the Tsubaki Chaya, each holding the dedicated book. From left to right: Renaud Frejafond, Nolwenn Cosnard, Christine Segorb, Vincent Scotto, Bertrand Wendling, Mehdi Matagne (CCI France Japon) and Mr Shibuya (SDI).

[7] A "large and very powerful" typhoon (950 hPa, winds of 45 m/s) on 23 October 2026, then south of Okinawa and moving north towards Kyūshū; heavy rain over western Japan from the 23rd (Weathernews, tenki.jp).



Mr Shibuya brush-writes the dedications.



The table at the Tsubaki Chaya: charcoal-grilled fish, sashimi, horned turban shells (サザエ) and vegetables.

> *"We were extremely well received throughout this visit. This trip strengthens our commitment to cooperation between France and Japan on the coexistence of fisheries and offshore wind, and on the deployment of artificial reefs."*
>
> Summary dictated by the delegation, 24 October 2026

KEY POINTS FROM 23 OCTOBER

- Gotō documents what was missing elsewhere: **what fisheries obtained** (a 20-year fund) and **what the territory gained** (jobs, tax revenue, image).
- Cooperation with SDI can take concrete shape: **Mr Shibuya has been invited to France** and wishes to spend time at sea, meet the fishers and dive.

Day 7 · Day 8

24–25

OCTOBER

Return to France

Fukue › Fukuoka › Tokyo Haneda › Paris CDG › Montpellier

Sat 24 Departure from the hotel at 08:00; 09:35 flight from Fukue to Fukuoka, then 10:50 flight to Tokyo Haneda (arrival 12:35); luggage left at Terminal 3 left-luggage; free afternoon in Tokyo.

Sun 25 Flight from Haneda at 00:05, arrival at Paris CDG at 07:00; 09:15 flight, arrival in Montpellier at 10:40.

分析

3

Thematic analyses

The legal framework, the weight of the cooperatives, the cases of Chōshi and Gotō, artificial reefs, and a comparison of the three territories.

3.1 The Japanese legal framework for offshore wind

The Act on Promoting the Utilisation of Sea Areas for Marine Renewable Energy organises the designation of "promotion zones" and the selection of operators. It was shaped in part by pressure from fishers, who secured safeguards at several levels of the hierarchy of legal texts.

Main source: presentation in French by JF Zengyoren, 21 October 2026. Dates of the Act (adopted late 2018, in force from April 2019) quoted from memory[8].

The three stages of planning

Zone in preparation
準備区域 · studies and consultation begin

Candidate zone
有望区域 · literally "promising zone": a consultation committee is set up

Promotion zone
促進区域 · designated zone, open to tender



Map of offshore wind zones in Japan (SDI slide): promotion zones in red, candidate zones in orange, zones in preparation in green. Chōshi (no. 4) and Gotō (no. 1, floating) are promotion zones; the sea south of Gotō (no. 37, floating) is in preparation.

On 3 October 2025, the Ministry of Economy (METI) and the Ministry of Infrastructure classified two new candidate ("promising") zones (off Akita and Hibikinada, Fukuoka Prefecture) and three new zones in preparation: off Asahi (Chiba Prefecture, next to Chōshi), **south of Gotō for floating wind**, and off Ichikikushikino (Kagoshima). The same press release launched site surveys by the public agency JOGMEC, under a "centralised system" in which the State carries out the preliminary surveys itself.

The fishers' six demands and what they obtained

No.	JF demand (20 February 2018)	Response obtained	Level of text
1	No promotion zone without the prior consent of the fishers concerned	Designation is conditional on there being no hindrance to fishing; zones where obstacles are foreseeable are excluded; ministers consult fisheries organisations before any designation	ACT Art. 8(5) · BASIC POLICY sections 3 and 4
2	Mandatory fisheries impact assessments for project developers	Included in the Basic Policy: fisheries impact assessments by the operator are reviewed within the committee, zone by zone	BASIC POLICY section 4
3	Fishers as explicit members of the consultation committee	Fisheries organisations are ex officio members of the committee, alongside the ministers, the governor and the mayors	ACT Art. 9(2)
4	Effective cooperation with fisheries as a condition for approving occupation plans	Response not photographed[9]	

No.	JF demand (20 February 2018)	Response obtained	Level of text
5	Operator liability, including compensation, even after installation	Response not photographed [10]	
6	Any occupation permit conditional on the prior consent of fishers	Project implementation is conditional on the prior consent of the fishers concerned	GUIDELINES

THE THREE PRINCIPLES DEFENDED BY JF

- The project must not, in a reasonably foreseeable way, harm fishing.
- No promotion zone without the consent of the fishers concerned.
- Fishers' understanding and support at every stage of the committee's work.

JF'S METHOD

The uncertainties are mutual: fishers do not know the impacts or the possible measures, and developers do not know what form coexistence will take. JF therefore calls for consultation **at prefecture level**, led by JF, and **before** classification as a promising zone.

KEY POINTS FOR FRANCE

- **There is no veto written into the Act.** The safeguard combines a legal criterion (no harm to fishing) with a requirement for prior consent in the implementing texts. Exact wording to use: "a legal criterion of no harm to fishing, and prior consent of fishers required by the government's Basic Policy".
- **Timing matters as much as content**: consultation takes place before the zone is designated, not at project stage. This is the point most transferable to floating offshore wind planning in the Mediterranean.
- **Fisheries impact assessments are paid for by the developer**, which echoes the socio-economic work carried out on the Mediterranean floating projects.

[8] To be confirmed: exact dates of adoption (late 2018) and entry into force (April 2019) of the Act.

[9] To be confirmed: the government's response to demand no. 4, shown on pages of the JF presentation that were not photographed.

[10] To be confirmed: the government's response to demand no. 5, including compensation, on pages that were not photographed.

3 · ANALYSES

3.2 The weight of the fisheries cooperatives

The question came up at every stage: why do Japanese fishers carry so much weight in dealing with wind developers? The answer lies in the cooperative system, which brings together in a single structure, from local to national level, political representation, access to the resource and the economics of the trade.

1948
Fisheries Cooperative Act; cooperatives inscribed on UNESCO's intangible heritage list in 2016

≈ 240,000
Members, including associate members

825 + 617
Coastal and inland-water cooperatives (according to JF Zengyoren)

¥92.4bn
≈ €500m · JF Zengyoren turnover (financial year 2024), 242 employees

A three-tier pyramid

Level	Organisations	Functions
Local	Fisheries cooperatives (漁協, gyokyō)	Coastal fishing rights, fish auction, ice, fuel, admission of members, redistribution of subsidies
Prefectural	30 prefectural federations (JF Gyoren) and 12 credit federations (JF Shingyoren)	Marketing, credit, support to cooperatives, consultation with the prefecture
National	JF Zengyoren; JF Kyosuiren (mutual insurance); Gyosairen (fisheries insurance); Norinchukin (central bank for agriculture and fisheries)	Political representation, purchasing of inputs (fuel, materials, reefs), sales and export, insurance, credit

Business volumes give a measure of this power: the cooperatives and their federations generate around **¥1,054bn (≈ €5.7bn) in sales** at local and prefectural level and ¥523bn (≈ €2.8bn) at federation level, and manage more than ¥3,300bn (≈ €17.8bn) in deposits.

What we observed on the ground

IN CHŌSHI

- The cooperative **runs the fish auction** and sells there as an agent, for a 3% commission.
- It **bears the commercial risk** by advancing cash to vessel owners.
- It supplies **ice and fuel**.
- It **co-opts new fishers**, and therefore controls access to the sea.
- It is **joint project owner**, with the prefecture, of a ¥20.3bn (≈ €110m) port project.
- It is a **co-founder** of the local structures for coexistence with wind.

IN GOTŌ

- The territory's **three cooperatives** have sat on the consultation council since 2014.
- A **fisheries working group** mapped actual activity and proposed a "menu" of coexistence measures.
- The cooperatives **submit the applications** for aid to the fisheries support fund.
- The content of the fund is **agreed with them**.
- The Sakiyama fishing group **restored the hijiki itself**, with the prefecture and the city.

KEY POINTS

- **There is no equivalent in France**, where these functions are split between fisheries committees, producer organisations, supply cooperatives and Crédit Maritime.
- The political weight of Japanese cooperatives **rests on their economic weight** and on a long-standing legal foundation. This is what enabled JF to obtain its demands on wind.
- The cooperatives are also **restoration actors**: JF distributes reefs, and fishers make substrates themselves.

3 · ANALYSES

3.3 Chōshi: a giant port facing fixed-bottom wind

Located at the eastern tip of Chiba Prefecture, where the warm Kuroshio and the cold Oyashio currents meet, Chōshi is Japan's leading fishing port by volume. It is also home to a fixed-bottom offshore wind turbine, and its coast is classified as a promotion zone for a commercial wind farm.

223,994 t
Landed in 2025 (1st port by volume)

¥24.3bn
≈ €131m · Value in 2025 (6th port by value)

86%
Share of Japanese sardine in volume

188
Licensed buyers at the fish auction

The breakdown of landings by species is shown in Chart 1 (day of 20 October).

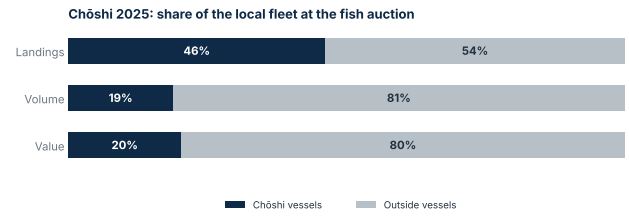


Chart 3 · Share of the local fleet. Chōshi vessels account for 46% of landings but only 19% of volume and 20% of value. Delegation's calculation based on the JF Chōshi brochure.

LINE FISHING AS A MARK OF QUALITY

Sardine sells for ¥59/kg (≈ €0.32/kg), line-caught splendid alfonsino for ¥2,477/kg (≈ €13.40/kg). Alfonsino accounts for 0.2% of volume but 4% of value, and has a dedicated brand, "Chōshi Tsuri-kinme". The fishers regulate this fishery themselves: 3 hours a day, 60 hooks maximum, release of small fish, tagging (see 20 October). The parallel with "Thon Rouge de Ligne" and "Méditerranée Sauvage" is direct.

Average prices calculated by the delegation.

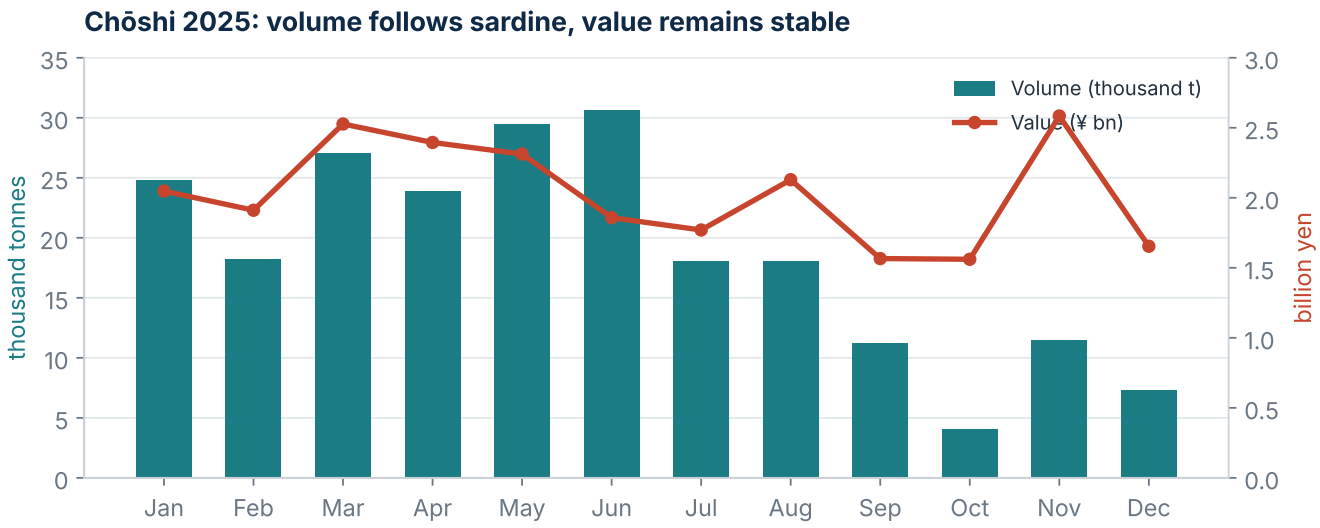


Chart 4 · Seasonality in 2025. Volume peaks in spring with sardine; value remains stable, between ¥1.6bn and ¥2.6bn per month (≈ €9m to €14m). Source: JF Chōshi brochure 2026.

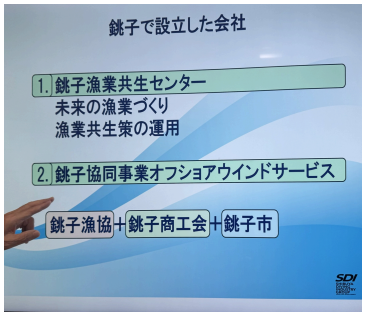
Coexistence entrusted to local structures

SDI presented two structures set up in Chōshi to organise coexistence with wind:

1. **The Chōshi Fisheries Coexistence Centre** (銚子漁業共生センター), tasked with "building the fisheries of the future" and implementing coexistence measures.
2. **An offshore wind services company** (銚子協同事業オフショアウインドサービス).

Their founders are the **fisheries cooperative**, the **chamber of commerce and industry** and **Chōshi City**. An article in Nikkan Suisan Keizai (3 August 2022) describes the marine environment survey launched in May 2022 by the cooperative, with SDI, in the promotion zone: ROV and multibeam sonar surveys, to prepare supplementary income during closed seasons and new fisheries. The cooperative's youth section visited Gotō as early as July 2022.

[11]

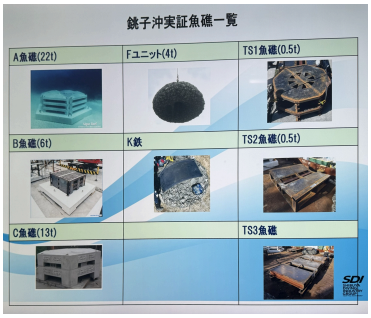


"Companies created in Chōshi": cooperative + chamber of commerce + city (SDI slide).

[11] To be confirmed: statutes, actual activity and future of these structures following the difficulties of the Chōshi wind farm project.

Experimental reefs around the wind turbine

Following the environmental survey, SDI deployed eight types of experimental modules at five sites at depths of 13 to 20 m, all located within the wind promotion zone, as well as "filter units" (bags of blocks) on the submerged base of the fixed-bottom turbine. Stated objective: restocking of fish and Japanese spiny lobster. The modules were deployed around November 2023 (delegation's calculation).



The eight modules tested, from 0.5 to 22 t, in concrete and steel (SDI slide).



Deployment of a module by crane barge off Chōshi (SDI slide).

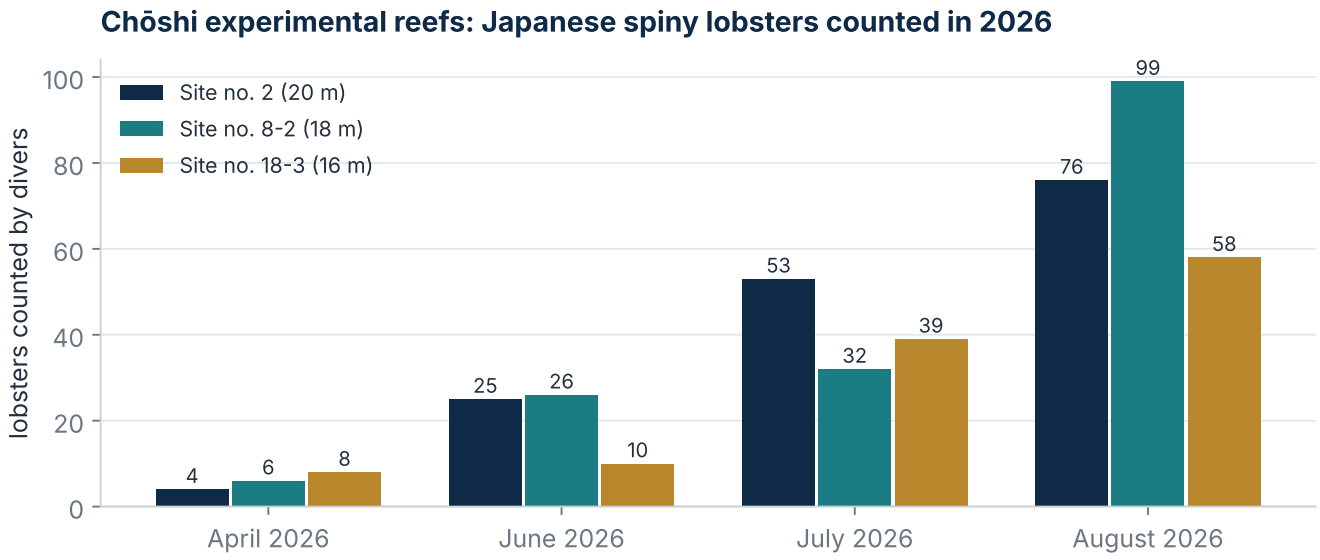


Chart 5 · Spiny lobsters counted by divers at three sites in 2026. SDI concludes there was "an increase of about 20 times". Source: SDI slides.

HOW TO READ THESE RESULTS

- **What is observed**: modules placed on sand are colonised by spiny lobsters and rockfish (scorpionfish, rockfish, grunts), with high numbers in reefs with cavities. More than 30 species of fish and other organisms have been recorded.
- **What remains to be clarified**: the "20-fold increase" corresponds to a rise from 4 to 76 spiny lobsters between April and August 2026 at one site. To distinguish the effect of the reefs from seasonal variation, and net production from the aggregation of individuals coming from nearby rocks, a baseline survey and comparison sites would be needed. The module intended for seaweed has not yet produced any seaweed at 16 m.
- **A point raised during the meetings**: SDI consistently stresses the need for a baseline survey before any deployment. However, it has not always been able to carry one out, for lack of the project developer's agreement. The delegation fully shares this approach.
- **Going further**: the full report, the sizes of the spiny lobsters and the counts from previous years would make it possible to fully exploit these results.

3 · ANALYSES

3.4 Gotō: the pioneer of floating offshore wind

The Gotō archipelago, west of Nagasaki, has hosted a floating wind turbine demonstrator since 2013 and, since 2026, Japan's first commercial floating offshore wind farm. The city has made it a territorial project, for an island that has lost nearly two thirds of its population in sixty-five years.

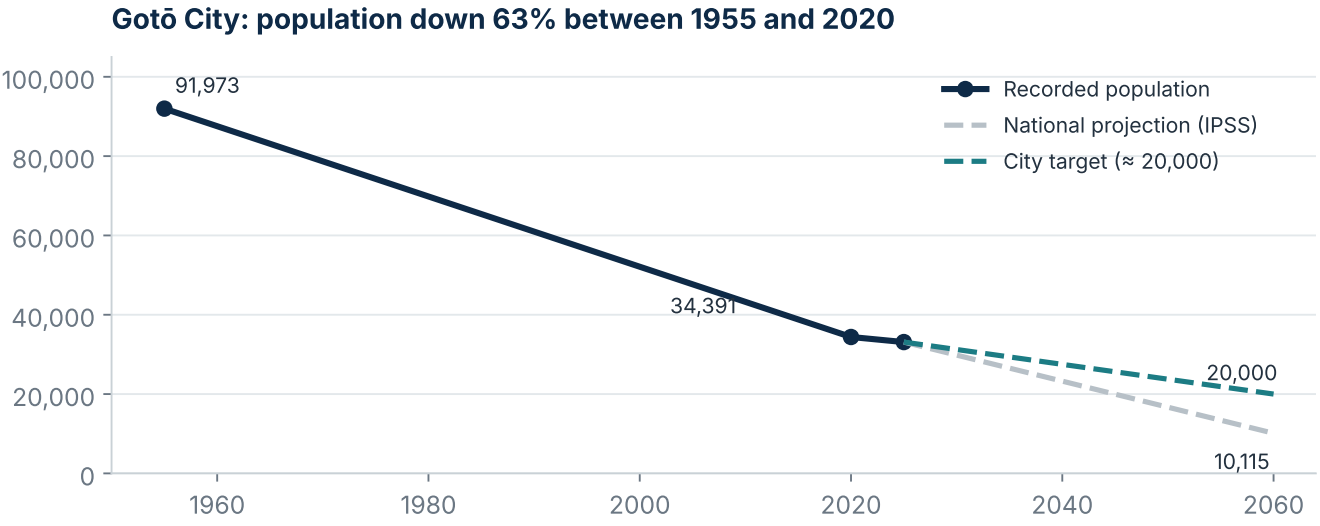


Chart 6 · Population of Gotō City. 91,973 inhabitants in 1955, 34,391 in 2020, 33,111 at the end of 2025. The city is aiming for around 20,000 inhabitants in 2060, compared with 10,115 according to the national projection. Source: Gotō City.

Fifteen years of history

2010 Launch of the Ministry of the Environment's demonstration programme.

2012 Small 100 kW test turbine.

2013 2 MW demonstrator off Kabashima.

2014 Hydrogen produced by the turbine; creation of the city's consultation council.

2015 Floating wind section and fisheries working group; local business study group.

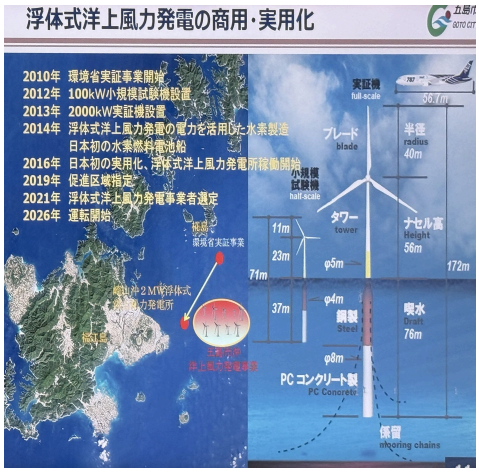
2016 First commercial operation of a floating wind turbine in Japan: the demonstrator, relocated off Sakiyama.

2019 Designation as a promotion zone.

2021 Selection of the operator.

2024 Launch of the fisheries support funds and citizen funds (20 years).

2026 Commissioning of the 8-turbine wind farm.



Timeline of floating offshore wind in Gotō and diagram of the hybrid spar demonstrator, steel and prestressed concrete (Gotō City slide).

The technology: a concrete and steel spar floater

- **"Spar" floater**: a ballasted vertical cylinder, steel in the upper part and prestressed concrete in the lower part.
- **Demonstrator**: rotor radius 40 m, nacelle at 56 m, draught 76 m, total height 172 m, chain mooring.
- **Water depth of about 100 m**; floater diameter of 4.8 m at the surface and 7.8 m underwater; catenary chains with intermediate buoys.
- **Fabrication at Fukue port**, launch by a semi-submersible barge ("Float Raiser"), uprighting by ballasting, installation of the nacelle and blades in sheltered waters north of Kabashima, then towing to site.
- **Operator**: Goto Floating Wind Farm LLC.[12]

EIGHT NAMES CHOSEN BY CHILDREN

Primary and lower-secondary pupils from Gotō and Shin-Kamigotō named the eight turbines, which are registered as ships: Kaze-terasu, Camellia Breeze, Gibaru-kaze, Gotokka-ze, Shii-chotto, Baramon-kaze, Mijo-kaze and Mugen-kaze. "Baramon" refers to the island's traditional kite.



The floater fabrication yard at Fukue port (SDI slide).



A floater at the end of fabrication, with its mooring chains on the quay (SDI slide).

[12] To be confirmed: consortium led by Toda Construction, unit capacity.

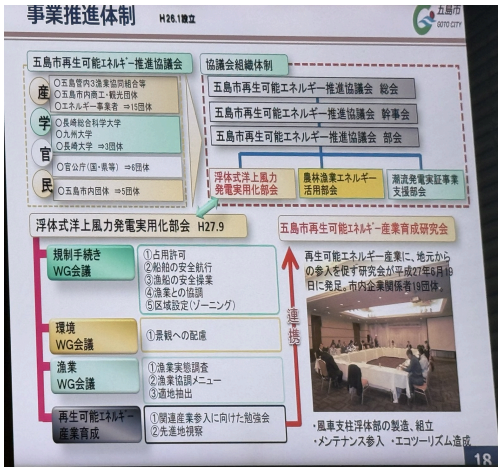
Governance: a consultation council from 2014

The **Gotō City Renewable Energy Promotion Council** (五島市再生可能エネルギー推進協議会), created in January 2014, brings together 29 organisations:

- **15 economic actors**, including the three fisheries cooperatives, commerce, tourism and energy companies;
- **3 universities** (Nagasaki Institute of Applied Science, Kyūshū, Nagasaki);
- **6 administrations** (State, prefecture);
- **5 associations** of the city.

Its floating wind section, created in September 2015, has four working groups:

Group	Topics
Regulation	Occupation, navigation safety, **fishing vessel safety**, **coordination with fisheries**, zoning
Environment	Landscape
Fisheries	Survey of actual activity, "menu" of coexistence measures, choice of sites
Supply chain	Training, visits to advanced sites



Organisation of the consultation in Gotō City (city slide).

FIVE YEARS OF WORK BEFORE THE DECISION

The fisheries working group mapped activity and chose the sites with the fishers between 2015 and 2019, before the administrative designation of the zone. This is exactly the method JF Zengyoren advocates at national level.

What fisheries obtained: a 20-year fund

The **Gotō City Floating Offshore Wind Fisheries Support Fund** (五島市浮体式洋上風力発電漁業振興基金) works as follows:

- **Funding**: donations from the project company, Goto Floating Wind Farm LLC, paid into the city budget, which adds its own share.
- **Duration**: 20 years from financial year 2024, i.e. the announced operating life.
- **Measures**: covering part of the **insurance premiums for fishing vessels**, and other fisheries support actions.
- **Governance**: the content is agreed by the city with the cooperatives; the cooperatives submit the aid applications; the city decides; implementation is reported to the consultation council.

A second fund, the **"Offshore Wind Dream Fund"**, follows the same mechanism for the benefit of residents: study placements abroad for young people and subsidies for buying electric vehicles.

[13]

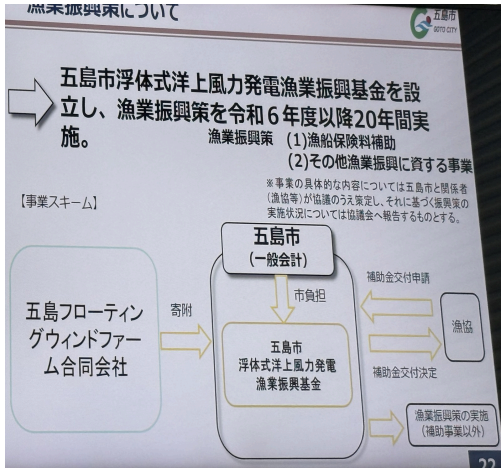


Diagram of the fisheries support fund: project company › city budget › fund › cooperatives (Gotō City slide).

A MODEL TO PROPOSE FOR THE AO6 AND AO10 WIND FARMS

- A **dedicated fund**, with a **duration aligned with operation**, and **governance shared** with the fishing industry.
- A **contractual and local** arrangement (a donation to the municipality), not a legal obligation.
- **French comparison**: in France, the offshore wind tax (Article 1519 B of the French General Tax Code) is already distributed for wind farms located in internal waters and the territorial sea, with 35% going to the fisheries committees. For wind farms located in the exclusive economic zone (EEZ), such as the AO6 and AO10 wind farms, the proceeds currently go to the State budget and their allocation has not yet been set (see Part 4).

[13] To be confirmed: annual amount, share of the developer and of the city, allocation key between cooperatives, existence of separate compensation.

What the territory gained

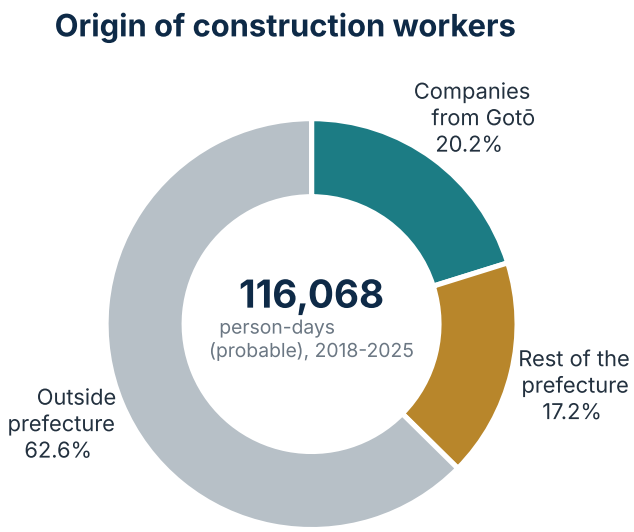


Chart 7 · Origin of construction workers, May 2018 – July 2025. Source: Gotō City.

- **Employment during construction**: 116,068 "cumulative workers", of whom 20.2% from Gotō companies and 17.2% from the rest of the prefecture. Offshore works (crane barges, cables) remained with outside companies.
- **The effect comes from the onshore works**: fabrication of the concrete floaters on the island generated more than 56% of onshore construction jobs.
- **Local materials and know-how**: beyond jobs, the project favours local materials. A Gotō concrete company was thus trained by a major mainland company to produce concrete meeting the requirements of wind turbine floaters.
- **Lasting employment**: 9 to 12 wind-related companies, 95 to 107 employees depending on the year (2022-2025).
- **Estimated ripple effect**: ¥4.1bn (≈ €22m) and 360 jobs (city forecast).
- **Taxation**: the floaters are taxed as **ships** (tax on depreciable assets), with 20 years of revenue expected.[15]

A CAUTIOUS READING

The total of 116,068 is very probably a cumulative count of person-days. Over seven years, this represents about 65 full-time equivalents on average, of which around fifteen for Gotō companies (delegation's calculation). The local effect is real but modest; the lasting effect will depend on maintenance.

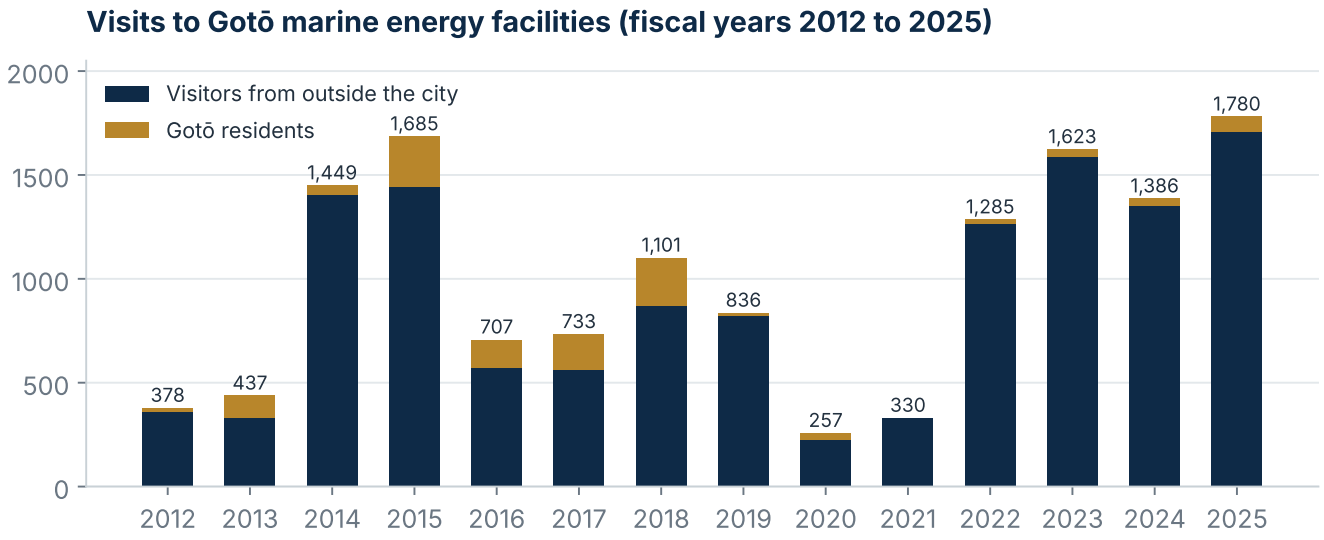


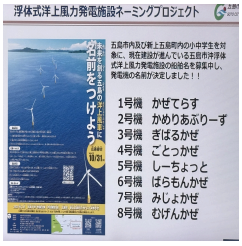
Chart 8 · Visits to Gotō's marine energy facilities. 13,987 visitors (1,266 groups) between 2012 and 2025, with a peak when the demonstrator arrived. The tourist office runs a booking platform, "Goto Ocean Energy Tour". Source: Gotō City.

[15] To be confirmed: ship tax status of the floaters and annual amount of revenue.

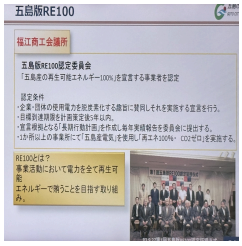
An ecosystem of local tools

Tool	How it works	Beneficiaries
Consultation council (2014)	29 organisations, fisheries working group, choice of sites	All actors
Fisheries support fund (2024-2044)	Donations from the project company, municipal management with the cooperatives	Fishers
Offshore Wind Dream Fund (2024-2044)	Same mechanism; study placements abroad, electric vehicles	Residents, young people
Citizen electricity company (2018)	Founded by local businesses; supplies municipal buildings with 100% renewable electricity produced in Gotō (contract of about 3,000 kW); redistributes part of its profits	City, associations, schools

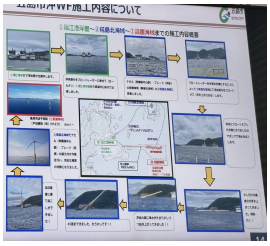
Tool	How it works	Beneficiaries
“RE100 Gotō version” (2021)	Label from the Fukue chamber of commerce for companies switching to 100% local renewable electricity within 5 years, with an annual report	Businesses
Visits and naming of the turbines	Booking platform; schoolchildren’s competition	Tourism, schools
Tidal energy (2016-2024)	Demonstrator in the Naru Strait: 500 kW (2021), then 1,000 kW (2024)	Energy sector



The naming of the eight turbines by the children.



The “RE100 Gotō version” label.



The construction stages, from port to site.

WHAT NEXT: A SECOND WIND FARM SOUTH OF GOTŌ

Since October 2025, the sea south of Gotō has been classified as a zone in preparation for a new floating wind farm. Consultation with fisheries will resume on a new zone: this is an opportunity to follow how the fund and the method of the first wind farm will be carried over. Useful contact: Mr Tatsufumi Hara, “Zero Carbon City” team at the city hall.

The floater turned reef: SDI’s observations

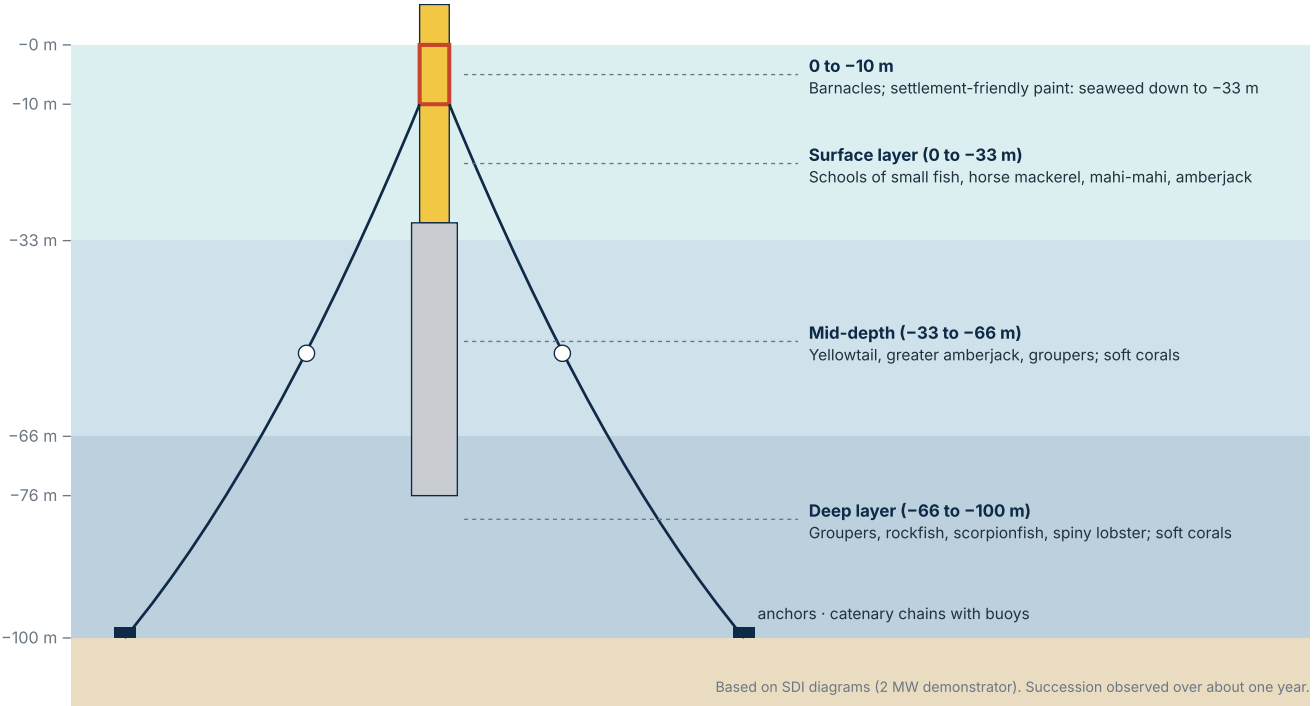
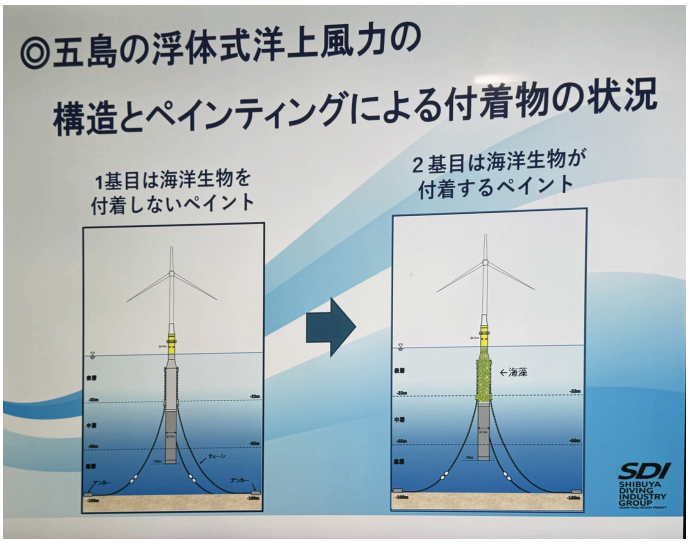
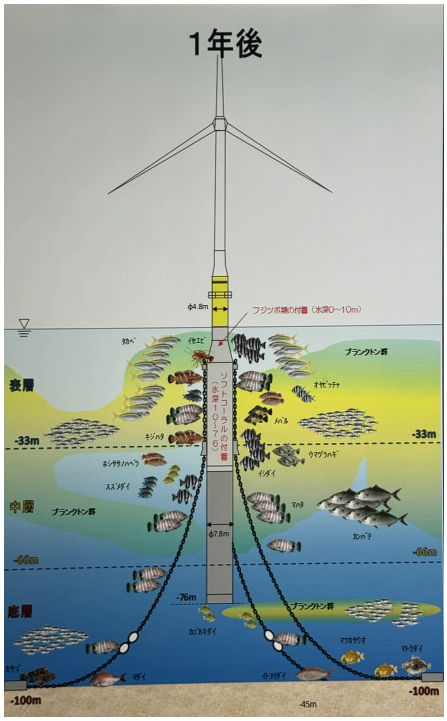


Diagram · The Gotō floater-reef. Zonation of the organisms observed on the 2 MW demonstrator, based on SDI diagrams.

SDI’s presentations in Gotō focus on the **2 MW demonstrator**, monitored since its installation. Their message can be summed up in one phrase: the “**transformation of the wind turbine into a reef**” (洋上風車の魚礁化), which caused “surprise and joy” among the fishers and strengthened their motivation.



The choice of paint: antifouling on the first machine, paint that encourages organisms to attach on the second (SDI slide).



"One year later": barnacles down to −10 m, soft corals down to −76 m, rockfish and pelagic fish (SDI diagram).

- **A succession presented in four stages**: plankton at 4-6 months, schools of small fish at 7-9 months, amberjacks and groupers at 10-11 months, a complete community at one year. These are conceptual diagrams, not measurements.
- **31 fish species observed**, including pelagic species (dolphinfish, amberjacks, rainbow runner, horse mackerel), groupers, rockfish and reef fish; **about twenty seaweeds and other organisms**, including spiny lobster, octopus and mussel.
- **A comparative fishing exercise in 2016**: the day's catch, laid out in three lots (floating wind turbine, artificial reef, natural reef), visibly shows a larger lot for the wind turbine. No weight or fishing effort is given.



Results of the comparative fishing: wind turbine, artificial reef, natural reef (SDI slide, 2016 photo).



The site's "coexistence design": floating reefs, guiding reefs, seaweed beds, spiny lobster reefs (SDI slide).

FOUR POINTS OF CAUTION

- **A single demonstrator**: the results do not cover the 8-turbine wind farm.
- **Results to be documented**: the succession is presented as a diagram and the comparative fishing as a photograph. Quantified data would be valuable for use in France.
- **Introduced species**: *Asparagopsis taxiformis*, observed on the floaters, is an invasive seaweed in the Mediterranean. Floating structures can act as stepping stones for non-native species.
- **Type of floater**: the Gotō spar probably differs from the floaters chosen for the French wind farms.[16]

KEY POINTS FOR THE MEDITERRANEAN WIND FARMS

- **An avenue to explore with caution**: in Gotō, the floater serves as habitat. In France, the energy companies we met stress that structures added to floaters or moorings would raise problems of excess weight, current loading and hydrodynamics. Reefs placed within the footprint of the wind farms remain the most realistic option; the choice of paint for the floaters, on the other hand, could be discussed.
- **A benefit for line fishers**: the aggregation effect on pelagic species benefits line fishing and trolling, provided fishing remains permitted near the turbines. This is the point that must be negotiated.
- **A lever for trust**: in Gotō, it was shared data, more than money, that changed the fishers' attitudes. Monitoring campaigns with fishers on board and results reported back to the prud'homies would have the same effect.

[16] To be confirmed: type of floater chosen for each French wind farm.

3 · ANALYSES

3.5 Artificial reefs and seabed restoration

Japan uses artificial reefs on an industrial scale. The mission met three families of actors: manufacturers, the national federation of cooperatives, which distributes reefs itself, and underwater works and survey companies such as SDI.

The actors and their products

Actor	Offer	Specific features
OKABE Co. Tokyo	Reefs for demersal and pelagic species, FADs, reefs for seaweed cultivation; modules from a few kilos to several tens of tonnes	Seaweed research organisation; activity in the Caribbean (FADs)
Kaiyo Kensetsu and **JF Zengyoren** Kurashiki · Tokyo	"JF Shellnurse" shell reefs: oyster, scallop and pearl oyster shells placed in mesh tubes mounted on a frame; small "Kaiso-kun" module	More than 16,000 Shellnurse units deployed since 1994; 15,136 Kaiso-kun in 35 prefectures; substrates filled by fishers
SDI Kawasaki	Seabed diagnosis, deployment and monitoring of modules, reefs around wind turbines, monitoring by diving, ROV and AUV	More than 70 sites; close partnership with the cooperatives

The shell reef: an interesting avenue for the Mediterranean

- **Principle**: stacked shells create many small spaces, providing habitat for the shrimps, crabs and worms that feed fish, shelter for juveniles and a substrate for seaweed.
- **Range**: seaweed reefs, breeding reefs (spiny lobster, octopus, juveniles), fish reefs up to 15 m high and 65 t, squid spawning grounds, port versions.
- **Kaiso-kun**: 60 × 55 × 47 cm, 60 kg (30 kg in water), 31 litres of shells, can be placed by hand by fishers.
- **Funding**: national programme for fishing-ground productivity, aid for remote islands, prefecture and municipal budgets, companies, port works.
- **An abundant resource at home**: the Thau basin produces large volumes of oyster and mussel shells, currently considered waste. This material has many advantages: it is locally available, inexpensive, porous and favourable to colonisation by living organisms.
- **Combined with concrete**: shells can be incorporated in batches, at low cost, into concrete structures to build large-volume reefs more cheaply. This is an avenue for all reef projects in the Mediterranean, along the coast as well as within the footprint of wind farms, and not only for the lagoon.

FIGURES TO BE DOCUMENTED

The Japanese brochure claims about 300 times more food organisms than a flat element; the English leaflet, 80 times more in 12 months and 284 times in 23 months. Only one economic study is cited: ¥8,733 (≈ €47) of revenue per fishing hour on Shellnurse, compared with ¥7,333 (≈ €40) on an artificial reef and ¥6,685 (≈ €36) on a natural reef (2012). The original publications should be requested.

Obstacles in France: legal status of shells (waste or animal by-product), sanitary treatment, authorisation for immersion.[17]

Three funding models

The developer

In Chōshi, SDI describes habitats commissioned by electricity companies and wind developers, directly or through the cooperative.

The State

OKABE describes reefs mainly funded by the State, with the prefectures and the cooperatives.

Local

Kaiso-kun draw on a range of programmes, from municipal budgets to companies.

[17] To be confirmed: French regulatory framework applicable to the immersion of shells.

Isoyake and the return of hijiki in Sakiyama

Isoyake (磯焼け) refers to the disappearance of kelp forests on rocky seabeds (barren grounds). SDI reports it along the whole Pacific coast, from Chiba to Kyūshū, and in Gotō. The case of Sakiyama, on Fukue Island, facing the demonstrator, is the best-documented restoration result of the mission, as it is quantified by an independent source (Nagasaki Shimbun, 10 September 2019).

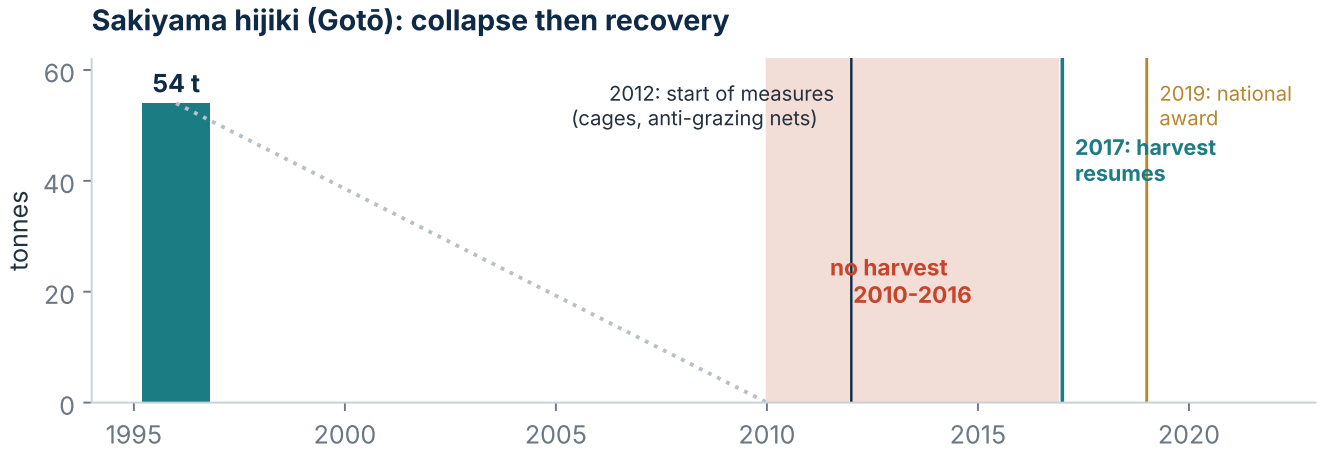


Chart 9 · Hijiki harvest in Sakiyama. 54 t in 1996, no harvest at all from 2010, resumption in 2017. Tonnage of the resumed harvest not disclosed. Source: Nagasaki Shimbun, based on Nagasaki Prefecture.

- **The diagnosis**: in 2012, the Sakiyama fishing group (50 members) began taking action with the prefecture and the city. Caging trials identified the cause: **grazing by herbivorous fish**, notably *Siganus* (アイゴ) and *Kyphosus* (イスズミ).
- **The actions**: anti-fish nets around the rocks and transplanting of hijiki.
- **The results**: resumption of the harvest in 2017; return of the lower-secondary school's educational harvest in 2018; national "Yutakana Umi-zukuri" award in 2019.

A DIRECT PARALLEL WITH THE MEDITERRANEAN

Salema (*Sarpa salpa*) and, in the eastern Mediterranean, invasive rabbitfish (*Siganus luridus*, *S. rivulatus*) also create barren seabeds. The caging method for identifying the cause should be included in the state of the art of the active restoration projects (FISHWIND, RESTOR, BRESTOR).



Hijiki harvest on the coast facing the wind turbine (SDI slide, 2016 photo).

A CLARIFICATION ON THE ORIGIN OF THIS SUCCESS

SDI presents the hijiki as a success achieved on the coast facing the wind turbine. The 2019 article attributes the restoration to the fishing group, the prefecture and the city. It is above all a fine example of fisher-led restoration, on the same stretch of coast as the demonstrator.

3 · ANALYSES

3.6 Three territories, three models

Each stage of the mission sheds light on one facet of coexistence. The table below sets them side by side.

	Chōshi · Chiba	Tokyo · national	Gotō · Nagasaki
Wind	One fixed-bottom turbine; commercial wind farm in a promotion zone [18]	Legal framework of 2019; new zones classified in 2025	Floating demonstrator (2013) and 8-turbine wind farm (2026); second wind farm in preparation
Fisheries actor	Integrated cooperative: fish auction, ice, fuel, co-option	JF Zengyoren: political representation, purchasing, sales, credit	Three cooperatives on the consultation council; fishing groups
Key tool	Dedicated structures: coexistence centre, services company	Six written demands followed up point by point	20-year fisheries support fund
Habitats	8 experimental modules, filter units on the base	Shellnurse supply chain, Kaiso-kun; OKABE	Floater-reef, adapted paint; restored hijiki
Territory	¥20.3bn (≈ €110m) port project; "fresh tuna" tourism	—	Construction jobs, taxation, citizen fund, RE100, visits
Limitations	No baseline survey carried out (for lack of the project developer's agreement); uncertain future for the wind farm	Prior consent outside the Act; compensation not documented	Amount of the fund unknown; results from a single demonstrator



Elsewhere in Japan: fixed-bottom wind within Akita port, presented by SDI as another model of integration (SDI slide).[19]

[18] To be confirmed: current status of the Chōshi commercial wind farm project.

[19] To be confirmed: operating status of the Akita wind farms.

提言

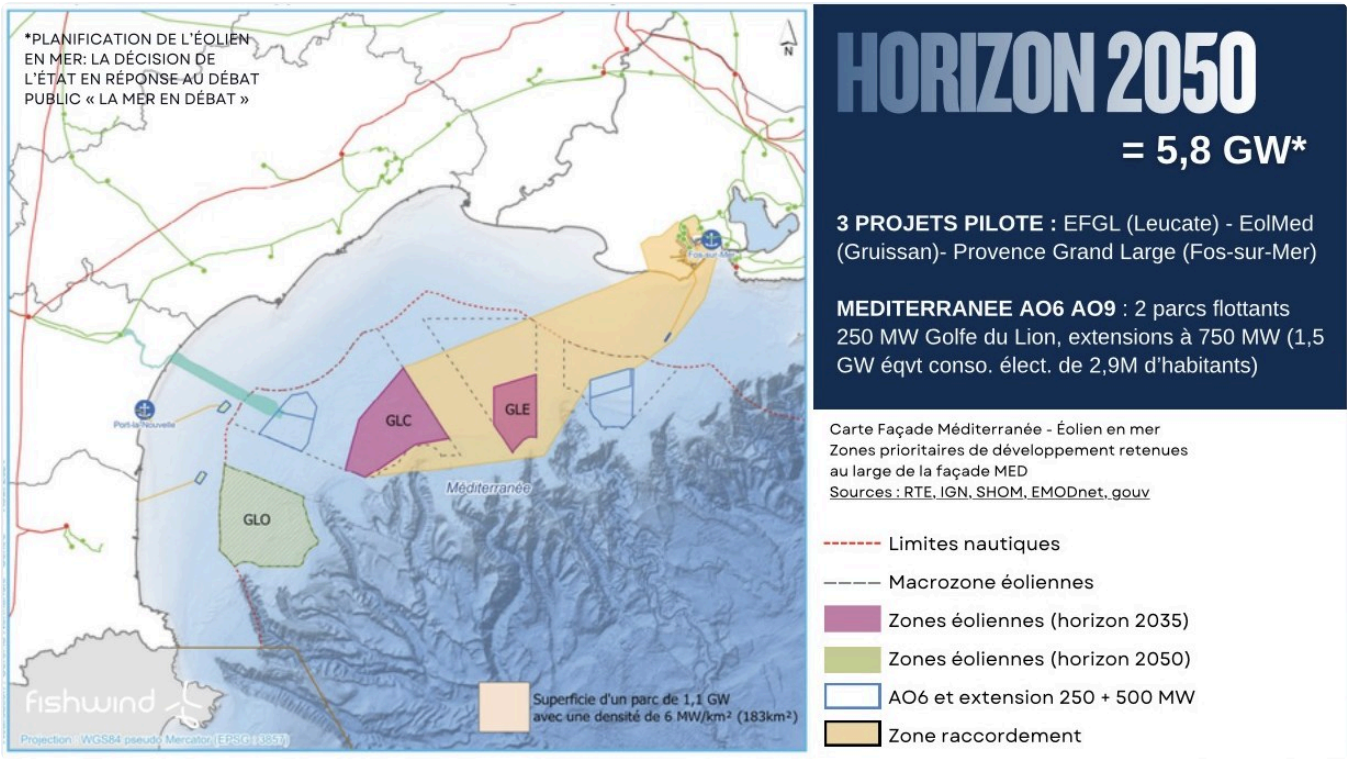
4

Lessons for the Mediterranean and next steps

What can be transferred to the Gulf of Lion, what cannot, and the next stages of France-Japan cooperation.

Japan and France: two parallel trajectories

Japan and France are building their floating offshore wind at the same time and in the same sequence: demonstrators, then the first commercial wind farms, then large-scale planning. The FISHWIND project covers all the future commercial wind farms in the French Mediterranean: the two AO6 wind farms and their extensions (AO9), then those of AO10, a total of 5.8 GW by 2050. Each country is ahead of the other on certain points: both have an interest in learning from each other.



Map 3 · Offshore wind planning in the French Mediterranean (FISHWIND document). Three pilot wind farms (EFGL at Leucate, EolMed at Gruissan, Provence Grand Large at Fos-sur-Mer); two 250 MW floating wind farms (AO6) with their extensions up to 750 MW (AO9); wind zones for 2035 (GLC, GLE) and 2050 (GLO); grid connection zones. 2050 horizon: 5.8 GW. Sources: RTE, IGN, SHOM, EMODnet, State decision following the public debate "La mer en débat".

Stage	Japan	France · Mediterranean
Demonstrators	Gotō: 100 kW turbine (2012), 2 MW spar demonstrator (2013), in commercial operation since 2016	Three pilot wind farms of three turbines each: Provence Grand Large (Faraman), EFGL (Leucate) and EolMed (Gruissan) [20]
First commercial wind farms	Gotō: 8 floating turbines, commissioned in 2026	**AO6**: Éoliennes Flottantes d'Occitanie (Ocean Winds, Banque des Territoires), off the Narbonne coast, and Éoliennes Méditerranée Grand Large (EDF Renouvelables, Maple Power), in the Gulf of Fos; 250 MW each, with extensions up to 750 MW (AO9)
Large-scale planning	Preparation, promising and promotion zones; new zones designated in October 2025, including floating wind off southern Gotō	**AO10**: around 10 GW across 11 projects, including three Mediterranean zones (Narbonnaise Sud Hérault, Golfe du Lion Centre, Golfe de Fos); specifications published in June 2026, winners to be announced in February 2027
Role of fishers	Statutory members of the consultation council; prior agreement required by government guidelines	Public debate, maritime seaboard bodies and a specialised offshore wind commission; no formal prior agreement [21]
Compensation for fisheries	Local fisheries support fund over 20 years (Gotō), financed by the project company	Offshore wind tax: allocation set for the territorial sea (35% to the fisheries committees); for the EEZ (AO6 and AO10 wind farms), revenue paid into the State budget, allocation not yet set
Habitats and reefs	Floater-reef (Gotō), reefs placed around the turbine (Chōshi), national reef industry	Subject of the FISHWIND project: artificial reefs on commercial wind farms

WHAT FRANCE CAN TAKE FROM JAPAN

- Consultation with fisheries **before** zones are designated, with a permanent fisheries working group.
- A **fisheries support fund** per wind farm, over the entire operating life, where French law allows it (wind farms in the EEZ).
- **Artificial habitats within the wind farm footprint**, with fishers involved in monitoring.
- **Local structures** for coexistence and services, led by fisheries and municipalities.

WHAT JAPAN CAN TAKE FROM FRANCE

- **Planning at seaboard scale**, with public mapping for 2035 and 2050.
- The **public debate** held ahead of the tenders.
- Feedback from **three pilot wind farms** using different floater technologies.
- **Grouped tenders** covering several zones, which make it possible to think at the scale of a fishing basin.

THE STAKES FOR FISHWIND

The AO6 and AO10 wind farms will occupy several zones in the Gulf of Lion and the Gulf of Fos. The Japanese tools, designed wind farm by wind farm, need to be conceived in France **at the scale of all the wind farms together**: a common framework for coexistence, monitoring and artificial reefs, rather than project-by-project negotiation.

[20] To be confirmed: commissioning status of the pilot wind farms.

[21] To be confirmed: French arrangements for consulting fisheries.

[22] To be confirmed: tax regime depending on the zone.

4 · LESSONS AND NEXT STEPS

What can be transferred, and what cannot

TRANSFERABLE

- **Consultation started before zones are designated**, at seaboard scale, with a fisheries working group that maps actual activity.
- **Written requests, followed up point by point**, on the model of JF's six requests.
- A **fisheries support fund** lasting as long as the operating period, managed with the industry.
- **Dedicated local structures** for coexistence, led by fisheries, the chamber of commerce and municipalities.
- **Reefs placed within the wind farm footprint**, with independent monitoring.
- **Industrial spin-offs** onshore: manufacturing, assembly and maintenance in ports.
- **Tools for residents**: citizen fund, visits, involvement of schools.

DIFFICULT TO TRANSFER

- The Japanese **integrated cooperative model** (fishing rights, fish auction, credit and fuel within a single structure), which has no equivalent in France.
- **Management of coastal fishing rights by the cooperatives**, which underpins their bargaining power.
- The **context of island remoteness** in Gotō, which makes every local job decisive.
- The **type of floater**: the Gotō spar, in 100 m of water, probably differs from the technologies chosen for the AO6 wind farms.[23]

Avenues for reflection for commercial floating wind farms (AO6, AO10)

WHAT FRENCH LAW ALREADY PROVIDES

Offshore wind farms are subject to an **annual tax per installed megawatt** (Article 1519 B of the French General Tax Code), revised every year: around **€19,890 per MW in 2024**. For a 250 MW wind farm such as those of AO6, this represents nearly **€5 million per year**. If the territorial sea allocation applied, the fisheries committees' share would be around €1.7 million per year per wind farm (indicative calculation by the delegation).

Wind farms located in…	Allocation of revenue (Article 1519 C of the CGI)
Internal waters and territorial sea (up to 12 nautical miles, around 22 km)	After 1.5% management fees: **50%** to coastal municipalities from which the installations are visible; **35%** to the maritime fisheries and marine aquaculture committees (15% to the national committee, 10% to the regional committees, 10% to the departmental committees concerned); **10%** to the French Biodiversity Agency (OFB), at seaboard level; **5%** to approved sea rescue organisations.
Exclusive economic zone (beyond 12 nautical miles, wind farms awarded since 2022)	Revenue is paid into the **State general budget**, with no allocation to fisheries or municipalities. Amendments to the 2026 finance bill propose an allocation (50% local authorities, 35% fisheries committees, 10% OFB, 5% sea rescue); to date, it has not been adopted.

The AO6 wind farms, located around 25 km from the coast, and those of AO10 appear to fall within the EEZ ★. It is therefore for these wind farms that the question of dedicated compensation for fisheries remains open, and where the Gotō example is most useful.

01 **Compensation for fisheries still to be built**: for the AO6 and AO10 wind farms, the share of the tax going to fisheries has not yet been set. The industry should take up this question. The Gotō fund offers an example of what such compensation can finance: vessel insurance, modernisation, setting up young fishers, with governance involving the producer organisation, the prud'homies and the regional committee.

02 **Cross-reference the seabed footprint with HALIOP data**: at Gotō, the surface footprint is 40 m, but the radius on the seabed is 300 to 400 m. It is the mooring zone, not the visible footprint, that determines access for trawlers and netters.

03 **Negotiate access for line fishing and trolling** within the wind farm, to benefit from the aggregation effect on pelagic species.

04 **Habitats around the wind farms rather than on the structures**: fixing reefs to the floaters or moorings would be ideal, but discussions with energy companies point to constraints of extra weight, current loading and hydrodynamics. Reefs placed within the wind farm footprint, where towed gear is excluded, and cable protections designed as habitats are the most realistic options. The choice of paint for the floaters could be discussed case by case. In all cases, scientific monitoring with a baseline survey, a control site and fishers on board is essential.

05 **Include the risk of introduced species** in monitoring, in particular *Asparagopsis taxiformis*.

06 **Secure spin-offs for the ports of the Gulf of Lion**: manufacturing, assembly, maintenance, service vessels.

Proposals for the active restoration projects (FISHWIND, RESTOR, BRESTOR)

01 **Make use of shells from the Thau basin**: an abundant and inexpensive raw material, they can be combined in batches with concrete structures to build large-volume reefs at lower cost, both offshore and along the coast. Trials could begin with small Kaiso-kun-type modules placed by fishers, after checking the regulatory framework.

02 **Build the protocol from the outset**: baseline survey, control sites, multi-year monitoring. This is the main lesson shared with SDI, which itself advocates systematic baseline surveys.

03 **Study the role of herbivores** in seabed degradation, using the caging method applied at Sakiyama.

04 **Combine funding sources**: long-term public funding, support from offshore wind and local budgets, on the model of the three sources observed in Japan.

★ To be confirmed: exact position of each wind farm relative to the 12-nautical-mile limit, and the outcome of the amendments to the 2026 finance bill.

[23] To be confirmed: floater technologies chosen for the AO6 wind farms.

4 · LESSONS AND NEXT STEPS

France-Japan cooperation

The visit strengthens the delegation's wish to cooperate with its Japanese partners on two subjects: coexistence between fisheries and offshore wind, and the implications of deploying artificial reefs.

Hosting Mr Shibuya in France

The delegation invited Mr Shibuya to come to France. He expressed interest, on one condition: **spending time at sea, meeting the fishers and diving**. A programme still to be built could include:

Activity	Content and purpose
Trip at sea	With small-scale fishers from Sète and, depending on the season, with a bluefin tuna line fisher
Diving	On artificial reefs in the Gulf of Lion and on degraded hard bottoms targeted by the active restoration projects (FISHWIND, RESTOR, BRESTOR) [24]
Fish auction and prud'homie	Visit to the Sète fish auction, comparison with electronic sales in Chōshi; meeting with a prud'homie
AO6 and AO10 wind farms	Presentation of the Mediterranean projects and HALIOP data; discussions with stakeholders in the consultation process
Ifremer and Thau	Meeting with the Sète station; shells from the Thau lagoon and the shell reef option

The most favourable diving season in the Mediterranean runs from May-June to October. [25]

Conclusion

Japan and France are moving in parallel towards floating offshore wind, but in very different environments: **oceanographic**, with depths, currents and typhoons that have no equivalent in the Mediterranean; **political**, with a legal framework that places fishers at the heart of consultation; **organisational**, with cooperatives that bring together the economy, access to the resource and representation of the industry; and **cultural**, with the sea seen first and foremost as a space for production and employment.

These differences do not reduce the value of the comparison; they make it all the more necessary. The two countries are building their first wind farms at the same time: there is a real need for **complete and simultaneous feedback**, shared between fishers, scientists, local authorities and developers on both sides.

The main lesson of this trip is the place Japanese fishers hold in the development of their territory. They do not simply endure projects: they negotiate them, accompany them and draw from them tools for their own future. It is this strong collaboration that the delegation wishes to bring to life in the Mediterranean, within the FISHWIND project.

FINAL THANKS

The delegation thanks once more all those who made this visit possible and so rewarding. **Mr Shibuya and Ms Hazuki Dwyer**, of SDI, for their welcome, their generosity and for sharing their experience. **Mr Mehdi Matagne**, of CCI France Japon, who was our guide every day and whose help was invaluable and indispensable. Ms Faustine Tobee and the CCI France Japon team, Ms Akiko Shioda, and all the fishers, cooperatives, local authorities and companies who welcomed us.

We regret that **Sylvain Pioch**, who initiated this venture, was unable to be with us.

[24] To be confirmed: sites, permits, supporting organisation.

[25] To be confirmed depending on the sites.

付録

A–F

Annexes

People met, glossary, detailed data, points to be checked, sources and catalogue of artificial reefs.

ANNEX A

People met

Based on business cards and lists provided during the meetings.

Organisation	Name	Position
OP SATHOAN delegation	Vincent Scotto	President, professional fisher (trawl)
OP SATHOAN delegation	Bertrand Wendling	Chief Executive Officer
OP SATHOAN delegation	Renaud Frejafond	Board member, bluefin tuna longline fisher
OP SATHOAN delegation	Christine Segorb	Deputy Director
OP SATHOAN delegation	Nolwenn Cosnard	Project Officer, environmental projects
Chōshi Fisheries Cooperative (JF Chōshi)	Kazuo Wada	Vice-President
Chōshi Fisheries Cooperative (JF Chōshi)	Kenichi Otsuka	General Manager
Chōshi Fisheries Cooperative (JF Chōshi)	Yasuhiro Ishige	Executive Director, sales
Chōshi Fisheries Cooperative (JF Chōshi)	Kazuo Kaneno	Board member; chair of the Tokawa fishers' council; vessel owner
Chōshi City	Hiroshi Yamaguchi	Deputy Mayor
Chōshi City	Yutaka Koashi	Director, Renewable Energy Promotion Office
Chōshi City	Takashi Hakkaku	Head of the Fisheries Division
Chiba Prefecture	Kei Tanaka	Deputy Director, carbon neutrality
Chiba Prefecture	Keita Suzuki	Senior Officer, Fisheries Division
Chiba Prefecture	Hidenori Sakamoto	Director of the Chōshi Fisheries Office
Shibuya Diving Industry (SDI)	Masanobu Shibuya	Founder, President and CEO; host of the delegation
Shibuya Diving Industry (SDI)	Hazuki Dwyer	Assistant to Mr Shibuya; support, Japanese-English translation
Shibuya Diving Industry (SDI)	Toshihisa Ono	Deputy Director, Kawasaki branch
Shibuya Diving Industry (SDI)	Akihiro Suguichi	Head of the works section
OKABE Co., Marine division	Shuta Kumamoto	Manager, reef sales department
OKABE Co., Marine division	Teppei Ichimaru	Reef sales department
NBK Corporation	Maria Zenigame	Assistant Manager, Global Project Dept.
JF Zengyoren	Masanobu Sakamoto	Chair of the Board of Representatives
JF Zengyoren	Shuichi Uchida	Representative Executive Managing Director
JF Zengyoren	Hideki Miura	Senior Executive Director, fisheries affairs
JF Zengyoren	Kazuhiko Ishikawa	Senior Executive Director, purchasing
JF Zengyoren	Kanamehan Tanaka	Adviser, Director of the Fisheries Affairs Department
JF Zengyoren	Makoto Sasuga	Deputy Director, fisheries affairs
JF Zengyoren	Shingo Fujita	Acting Director, fisheries affairs
JF Zengyoren	Kazuma Mukai	Research Officer, materials section
JF Zengyoren	Hironori Tanizaki	Deputy Director, general management
Gotō City	Tatsufumi Hara	Officer, “Zero Carbon City” team, Future Creation Division
Fisheries in Gotō	Federation of Gotō Fisheries Cooperatives and Gotō Fisheries Cooperative	
CCI France Japon	Faustine Tobee	Business Development, Business Services Manager
CCI France Japon	Mehdi Matagne	Delegation guide
Interpreter	Akiko Shioda	Japanese-French interpreter

ANNEX B

Glossary

Term	Japanese	Definition
Fisheries cooperative (gyokyō)	漁協	Local fishers' organisation that manages coastal fishing rights and often the fish auction
JF Zengyoren	全漁連	National Federation of Fisheries Cooperative Associations of Japan
Consultation council (kyōgikai)	協議会	Committee bringing together fishers, local authorities and government bodies for each wind zone
Promotion zone	促進区域	Zone designated for offshore wind, open to tender
Promising zone	有望区域	Candidate zone for designation
Preparation zone	準備区域	Zone where studies and consultation begin
Market commission	市場手数料	Levy on fish auction sales (3% in Chōshi)
Tender bidding	入札	Auction sale method based on bids
Isoyake	磯焼け	Disappearance of kelp forests on rocky bottoms (barren grounds)
Reef formation	魚礁化	Colonisation of a structure by organisms and fish
Hijiki	ひじき	Edible brown seaweed (*Sargassum fusiforme*)
Japanese spiny lobster	伊勢海老	*Panulirus japonicus*, target species of the Chōshi reefs
Spar	—	Ballasted vertical cylindrical floater, largely submerged
FAD	—	Fish aggregating device
Set net (teichi-ami)	定置網	Large fixed net guiding fish towards a capture chamber, similar to the madrague
AO6, AO10	—	French offshore wind tenders: AO6 (two 250 MW floating wind farms in the Mediterranean) and AO10 (around 10 GW, including three zones in the Mediterranean)
FISHWIND	—	Project dedicated to coexistence between fisheries and floating offshore wind in the Mediterranean and to artificial reefs on commercial wind farms
RESTOR, BRESTOR	—	SATHOAN projects for the active restoration of degraded hard bottoms in the Gulf of Lion, alongside FISHWIND
HALIOP	—	SATHOAN's fisheries information system

ANNEX C

Detailed data

Chōshi: 2025 landings by species

Species	Tonnes	Value (¥m)	≈ €m	Average price (¥/kg)*
Japanese sardine	193,026	11,372	61.5	59
Japanese anchovy	1,620	63	0.3	39
Horse mackerels	1,343	240	1.3	179
Mackerels	8,756	2,090	11.3	239
Pacific saury	4,659	822	4.4	176
Bonito	283	131	0.7	464
Tunas	3,911	3,239	17.5	828
Marlins	202	240	1.3	1,189
Sharks	266	48	0.3	181
Splendid alfonsino	389	964	5.2	2,477
Sea breams	326	195	1.1	597
Others	9,213	4,913	26.6	533

Species	Tonnes	Value (¥m)	≈ €m	Average price (¥/kg)*
Total	**223,994**	**24,317**	**131.4**	**109**

Chōshi: organisation of the fish auction

Operator and sales agent	Chōshi Cooperative
Market commission	3%
Licensed buyers	188, including 64 shippers, 49 retailers, 29 processors, 29 freezing companies
Payment	Vessel owner on day 4, buyer on day 9
Transactions committee	22 members, including 6 producers and 10 buyers
Port project	¥20.3bn (≈ €110m), 2018-2027, prefecture and cooperative

Gotō: wind-related companies

Financial year	Companies	Employees
2022	9	95
2023	9	96
2024	12	107
2025	11	95

Chōshi experimental reefs

Site	Seabed	Modules
No. 2 (20 m)	Thick sand	13 filter units, reefs B, C, TS1
No. 8-2 (18 m)	Thick sand	13 filter units, reefs B, C, TS1
No. 18-3 (16 m)	Thin sand over rock	14 filter units, reefs A, KT, TS3

* Average prices calculated by the delegation. Sources: JF Chōshi 2026 brochure, Gotō City, SDI.

ANNEX D

Additional information to collect

The mission opened up many avenues. To explore them further within the FISHWIND project, the delegation wishes to obtain the following information from its Japanese counterparts and the relevant French services.

FROM OUR JAPANESE COUNTERPARTS

- **Gotō City**: annual amount of the fisheries support fund, shares of the developer and the city, distribution among cooperatives, 2024-2025 results; full presentation slides.
- **Gotō cooperatives**: areas and gear permitted within the wind farm and around the moorings; whether separate compensation exists; observed effects on catches; names and positions of the representatives met.
- **SDI**: full report on the Chōshi reefs (baseline survey, control site, sizes, 2024-2025 counts, costs, funder); data from the Gotō comparative fishing; type of paint used on the floaters; status of "Marine Renewable Energy Fisheries Inc.".
- **JF Zengyoren**: pages 5, 6 and 8 of the presentation (responses to requests no. 4 and 5, compensation).
- **Kaiyo Kensetsu**: original publications on the effectiveness of shell reefs; costs per module; structural material and deployment depths.
- **OKABE**: documentation, costs, public funding programmes.
- **Nagasaki University**: full results of the environmental DNA and echosounder monitoring around the Gotō wind farm (Annex G).

POINTS TO DOCUMENT

- Precise timeline for the adoption and entry into force of the Japanese law and its revisions.
- Future of the Chōshi wind farm project following the consortium's withdrawal in 2025.
- Operator and capacity of the Gotō commercial wind farm; history of the "Haenkaze" demonstrator.
- Tax status of floaters in Japan (taxed as vessels).
- Calculation method behind the figure of 116,068 workers (person-days).
- Floater types and mooring line lengths selected for the AO6 and AO10 wind farms.
- Allocation of the offshore wind tax for wind farms located in the exclusive economic zone (EEZ).
- French regulatory framework for the immersion of shells and their use in concrete structures.
- Scientific identification of the species cited under their Japanese names.

ANNEX E

Documents received and sources

Origin	Documents
CCI France Japon	Learning Expedition programme (16 October 2026); detailed schedule
JF Chōshi	Brochure "銚子漁港魚市場 2026" (Chōshi port fish market); leaflet "Do You Know Choshi Fish in Japan?"
JF Zengyoren	Presentation in French on the offshore wind law and JF's position (21 October 2026); institutional brochure "For the future of fisheries and territories"; list of participants
JF Zengyoren / Kaiyo Kensetsu	JF Shellnurse brochure (August 2024 revision); English leaflet; Kaiso-kun data sheets and deployment map (April 2026)
NBK Corporation	Corporate brochure in English
SDI	Slides shown in Chōshi and Gotō: sites, isoyake, Chōshi structures, experimental reefs, floater-reef, comparative fishing, hijiki, coexistence design; article in the Nikkan Suisan Keizai (3 August 2022); article in the Nagasaki Shimbun (10 September 2019)
Gotō City	Slides: population, timeline, construction, consultation, visits, local benefits, fund, naming of the turbines, citizen electricity, RE100, new zones (METI press release of 3 October 2025)
Chiba and Chōshi authorities	National map of offshore wind zones
Delegation	Notes dictated during the visit, photographs

Base map: Natural Earth (public domain). Charts produced by the delegation from the documents cited.

ANNEX F

Catalogue of artificial reefs observed

This annex brings together the artificial reefs and habitats presented during the mission: their shape, materials, dimensions, deployment depth and what is known of their results. It is intended to serve as the technical basis for the reef component of the FISHWIND project.

Sources: SDI slides (Chōshi, Gotō), JF Shellnurse and Kaiso-kun brochures (Kaiyo Kensetsu, JF Zengyoren), discussions with OKABE. Dimensions are those given by the manufacturers; empty fields were not provided.

F.1 Overview

Family	Where	Designer	Materials	Scale	Main use
Chōshi experimental modules	Chōshi, wind zone, 13-20 m	SDI (and Kaiyo Kensetsu for B)	Concrete, steel, block bags	0.5 to 22 t	Spiny lobster, rockfish, seaweed, around a fixed-bottom turbine
JF Shellnurse	Throughout Japan (16,000 units)	Kaiyo Kensetsu, distributed by JF Zengyoren	Structure + shells in mesh tubes	0.5 to 65 t; 1 to 15 m high	Seaweed, breeding, fish, ports
Kaiso-kun	35 prefectures (15,136 units)	Kaiyo Kensetsu, designed with fishers	Shell basket on a base	60 kg	Seaweed beds, ports, foreshores, juveniles
OKABE reefs	Japan, Caribbean	OKABE Co.	Not provided	A few kg to several tens of t	Demersal species, pelagic species, FADs, seaweed farming
Floater-reef	Gotō, 100 m depth	Turbine (SDI for monitoring)	Steel and prestressed concrete, paint favouring settlement	76 m submerged column	FAD effect and habitat throughout the water column
"Coexistence" layout	Gotō (SDI vision)	SDI	Not provided	Entire wind farm	Anchored FADs, guiding reefs, spiny lobster reefs, seaweed beds

ANNEX F

F.2 Chōshi: eight modules tested in the wind zone

The modules were deployed around November 2023 at five sites 13 to 20 m deep, all located in the offshore wind promotion zone south of Chōshi, as well as on the base of the existing fixed-bottom turbine. They are grouped on sand, between rocky outcrops.

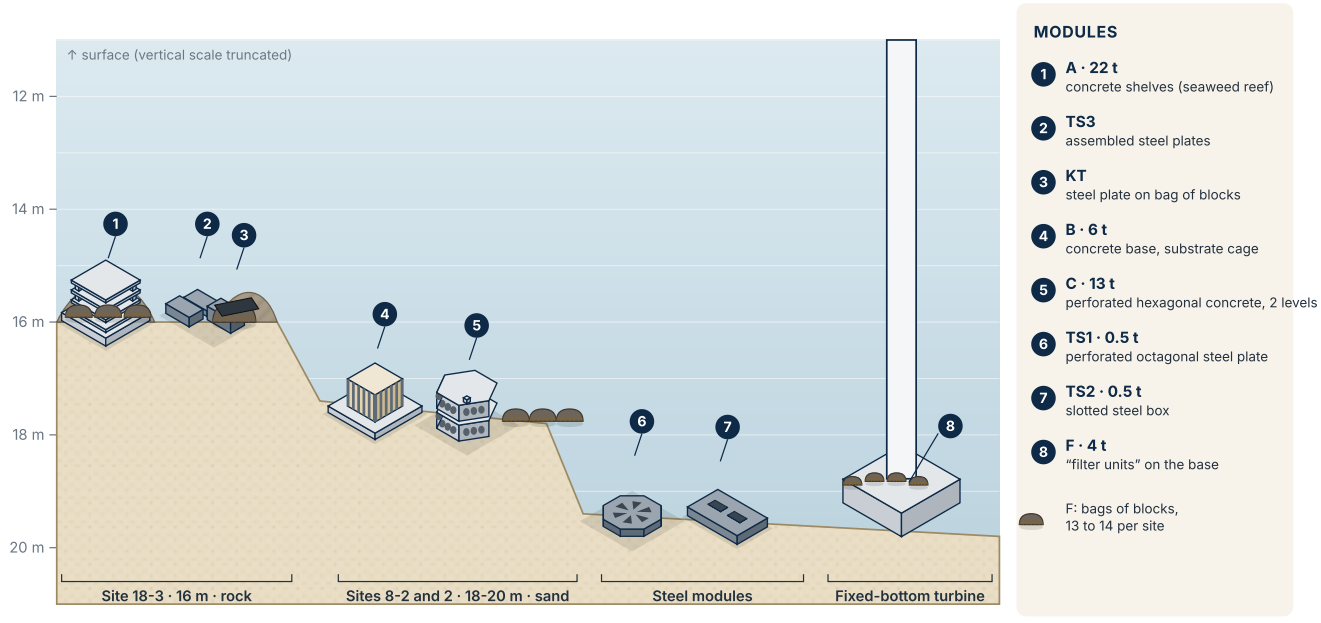


Diagram F1 · Typical cross-section of the Chōshi experimental sites. Schematic diagram based on the SDI slides.

THE MODULES BEFORE IMMERSION



A · 22 t
Concrete, "Algae Reef" shelves



B · 6 t
Substrate cage on a concrete base



C · 13 t
Perforated hexagonal concrete, 2 levels



F · 4 t
"Filter unit", blocks in mesh



KT
Steel plate on a block bag



TS1 · 0.5 t
Perforated octagonal steel plate



TS2 · 0.5 t
Slotted steel box

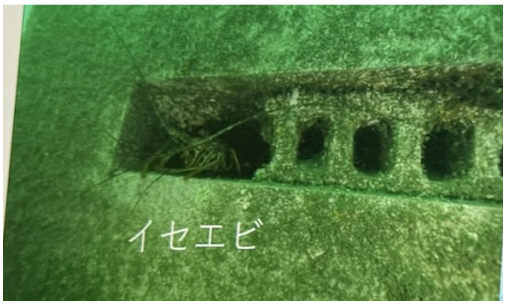


TS3
Assembled steel plates

Photos taken from the SDI slide "List of experimental reefs off Chōshi".

MODULE DATA SHEETS

Module	Weight	Material	Shape	Intended function	Spiny lobsters on 20/08/2026
A	22 t	Concrete	Stacked shelves, wide horizontal cavities	Seaweed reef ("Algae Reef") and shelter	30 (site 18-3); no seaweed recorded
B	6 t	Concrete base, frame	Frame holding substrates; Kaiyo Kensetsu product[26]	Shelter, probable shell substrate	15 (site 2); 20 (site 8-2)
C	13 t	Concrete	Perforated hexagonal, two levels	Spiny lobster shelter	31 (site 2); 42 (site 8-2): the most colonised
F	4 t	Blocks in a mesh bag	"Filter unit", 13 to 14 per site and on the turbine base	Roughness, small shelters	Not detailed
KT	—	Steel on a mesh bag	Steel plate on a block bag	Unknown[27]	Not detailed
TS1	0.5 t	Steel	Light octagonal structure	Shelter	19 (site 2); numerous scorpionfish
TS2	0.5 t	Steel	Light structure	Shelter	Not deployed at the detailed sites
TS3	—	Steel	Assembled steel plates	Shelter	6 (site 18-3); grunts around it



Spiny lobster in a cavity of module C, site 8-2, 20 August 2026 (2 years and 9 months after deployment).



Group of spiny lobsters at the foot of a module, site 8-2, same survey.

THE SITES

Site	Depth	Seabed	Modules
No. 23-2	13 m	Thin sand over rock	—
No. 26	15 m	Thick sand	—
No. 18-3	16 m	Thin sand over rock	14 F, A, KT, TS3
No. 8-2	18 m	Thick sand	13 F, B, C, TS1
No. 2	20 m	Thick sand	13 F, B, C, TS1

PROTOCOL AND LIMITATIONS

- Dive counts, 4 surveys in 2026 (April to August).
- No baseline survey carried out, for lack of agreement from the project developer; SDI nevertheless stresses that one is needed.
- Modules with **enclosed cavities** (C, A) hold the most spiny lobsters.
- The "seaweed" module has not yet produced any seaweed at 16 m.

[26] To be confirmed: manufacturer of module B (Kaiyo Kensetsu according to the watermark on the photo).

[27] To be confirmed: function of module KT (iron supply for seaweed?).

ANNEX F

F.3 The JF Shellnurse range and the Kaiso-kun

The principle: shells, a by-product of shellfish farming, are placed in mesh tubes (15 cm in diameter, 1 m long) mounted on a structure. The stacking creates many small spaces, providing habitat for the shrimps, crabs and worms that feed fish, shelter for juveniles and a substrate for seaweed. Fishers fill the tubes themselves. The range has been used in public works since 1994.

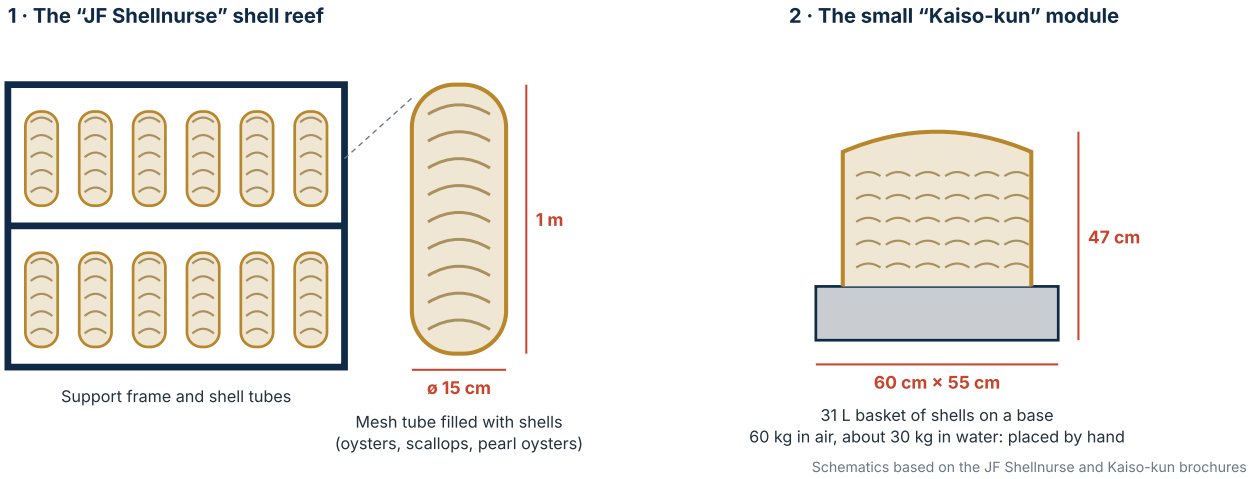


Diagram F2 · Principle of the shell reef and of the small Kaiso-kun module.

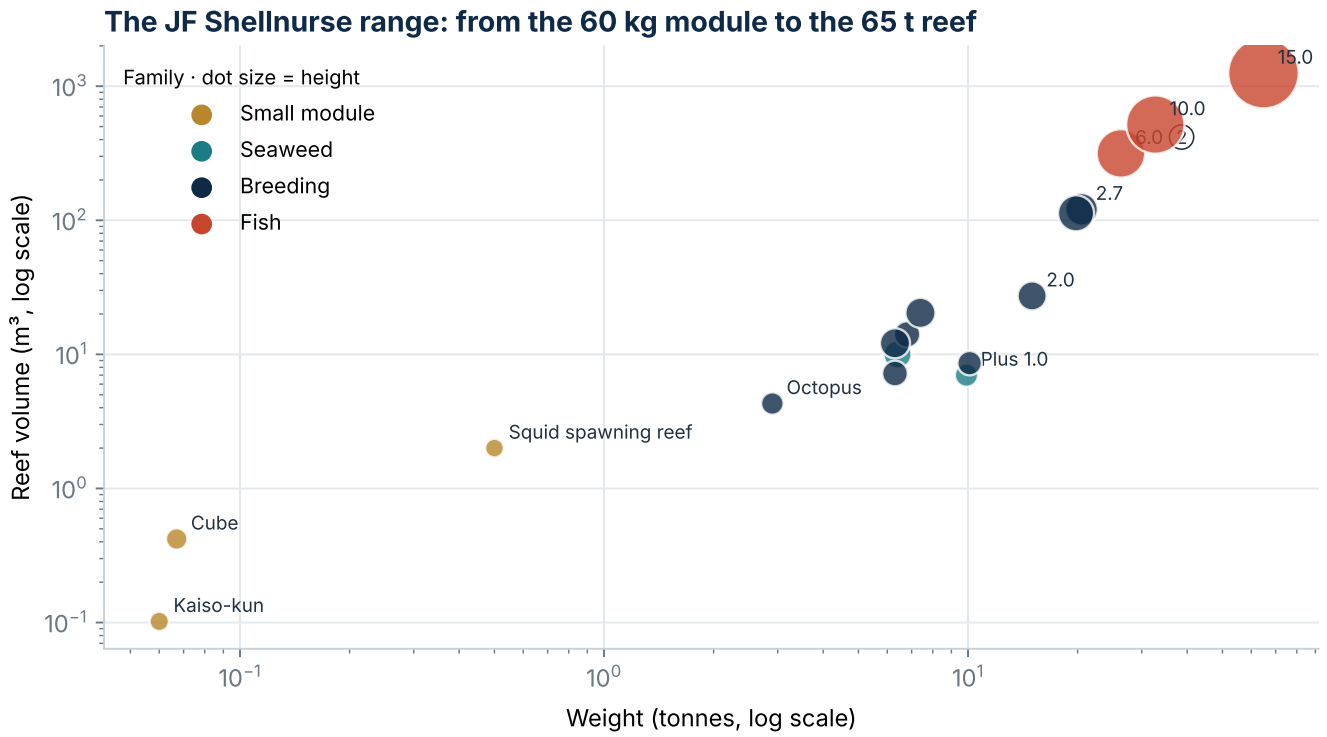


Chart F1 · The Shellnurse range: weight and volume of each model. Dot size indicates height. Source: JF Shellnurse brochure (August 2024).

Structural material (concrete or steel) and recommended deployment depths are not given in the brochures[28]. The dimensions are typical examples, adaptable to the site, objective and budget.

[28] To be confirmed: structural material and recommended deployment depths, to be requested from Kaiyo Kensetsu.

ANNEX F

MODEL SPECIFICATIONS (DIMENSIONS: HEIGHT × LENGTH × WIDTH)

Family	Model	Dimensions	Weight	Reef volume	Shells
Seaweed reefs 藻場礁	Plus 1.0	1.0 × 3.0 × 3.0 m	9.9 t	7.0 m³	0.3 m³ · 22 tubes
	Plus 1.0 anti-grazing	1.8 × 3.0 × 3.0 m	6.4 t	10.0 m³	0.3 m³ · 22 tubes
	Plus 1.3	— × 3.4 × 3.4 m	6.0 t	12.9 m³	0.6 m³ · 44 tubes
Breeding reefs 増殖礁	Juvenile protection	1.4 × 2.6 × 2.6 m	6.3 t	7.2 m³	1.8 m³ · 132 tubes
	Spiny lobster	1.2 × 3.5 × 3.5 m	10.1 t	8.6 m³	0.8 m³ · 62 tubes
	Octopus	0.9 × 2.4 × 2.4 m	2.9 t	4.3 m³	0.3 m³ · 21 tubes
	1.5	1.5 × 3.4 × 3.4 m	6.8 t	14.1 m³	1.2 m³ · 80 tubes
	2.2 ①	2.2 × 3.4 × 3.4 m	6.3 t	12.1 m³	1.2 m³ · 88 tubes
	2.2 ②	2.2 × 3.4 × 3.4 m	7.4 t	20.4 m³	1.6 m³ · 120 tubes
	2.0	2.0 × 5.5 × 5.5 m	15.0 t	27.3 m³	1.0 m³ · 76 tubes
	2.7	2.7 × 7.0 × 7.0 m	20.5 t	120.7 m³	2.6 m³ · 196 tubes
	3.5	3.5 × 6.7 × 6.7 m	19.8 t	112.8 m³	1.7 m³ · 124 tubes
Fish reefs 魚礁	4.0	— × 7.9 × 7.8 m	23.4 t	182.2 m³	3.5 m³ · 264 tubes
	6.0 ②	6.9 × 7.7 × 7.7 m	26.3 t	315.4 m³	3.5 m³ · 261 tubes
	10 × 10 m model	— × 10.0 × 10.0 m	40.0 t	492.6 m³	3.1 m³ · 232 tubes
	10.0	10.3 × 7.8 × 7.8 m	32.7 t	517.5 m³	5.7 m³ · 424 tubes
	15.0	15.4 × 11.0 × 11.0 m	64.8 t	1,251.2 m³	7.0 m³ · 522 tubes

Family	Model	Dimensions	Weight	Reef volume	Shells
Small modules	Kaiso-kun	0.47 × 0.60 × 0.55 m	60 kg	0.10 m³	31 L
	Cube	0.75 × 0.75 × 0.75 m	67 kg	0.42 m³	31 L
	Squid spawning reef	0.4 × 2.2 × 2.2 m	0.5 t	2.0 m³	0.3 m³ · 22 tubes

KEY POINTS ABOUT THE RANGE

- Shells account for only **0.5 to 4%** of the reef volume: they act as a biological "lining" on a load-bearing structure.
- The volume-to-weight ratio rises sharply with size: a 15 m fish reef weighs 65 t for 1,250 m³.
- Port version: substrates attached to quay caissons, toe blocks of structures or beneath pontoons.

KAISO-KUN IN PRACTICE

- Deployed by hand from a small boat, without lifting equipment.
- Options: protective net, octopus pots for egg-laying.
- Funded by national programmes, island support schemes, local budgets and companies.
- Ideal format for **pilot trials led by fishers**.

ANNEX F

F.4 Gotō: the floater as a reef

At Gotō, no module is placed at the foot of the turbine: it is the floater itself, submerged to 76 m in 100 m of water, that serves as habitat. The choice of a paint favouring the settlement of organisms, on the second turbine, allowed seaweed to colonise the floater down to about −33 m.

The zonation of the floater-reef is shown in the diagram in Part 3.4.

Characteristic	Value
Floater type	Hybrid spar: steel in the upper part, prestressed concrete in the lower part
Diameter	4.8 m at the surface; 7.8 m in the submerged part
Draught · depth	76 m · about 100 m
Mooring	Catenary chains with intermediate buoys; anchors 300-400 m from the tower
Colonisable surface	About 1,500 m² per floater (delegation's calculation: cylinder 4.8 to 7.8 m in diameter over 76 m) [29]
Species observed	31 fish, around twenty seaweeds and invertebrates (see Part 3.4)

THE ELEMENTS OF THE "COEXISTENCE DESIGN" PROPOSED BY SDI

Element	Japanese	Role
Floating reefs	浮き魚礁	Anchored FADs to concentrate pelagic species, for the benefit of line fishing and trolling
Guiding reefs	誘導魚礁	Large structures that guide fish towards fishing grounds
Spiny lobster reefs	イセエビ魚礁	Small modules with cavities, close to the coast
Restored seaweed beds	藻場	Restoration of kelp forests and action against isoyake

Dimensions, materials and funding not provided: this is a vision presented by SDI.

[29] To be confirmed: colonisable surface, estimated by the delegation from the floater's dimensions.

ANNEX F

F.5 Interpretation grid for the AO6 and AO10 wind farms

The reefs observed in Japan respond to very different situations. The table below offers an initial correspondence with the configurations of the floating wind farms in the French Mediterranean, to be refined with depth and seabed data for each zone.

Configuration	Solution observed in Japan	Points to study for the Mediterranean
Floaters (entire water column)	Gotō floater-reef, paint favouring settlement	Constraints reported by energy companies: extra weight, current drag, hydrodynamics; maintenance; introduced species. Avenue limited to the choice of paint.
Moorings and lines (seabed, 60 to 100 m and beyond)	No case observed	Modules attached to anchors unrealistic (same constraints); modules placed at a distance within the mooring footprint to be studied
Towed gear exclusion zone	Chōshi reefs (concrete and steel modules, 13-20 m)	Much greater depths offshore: large fish reefs (Shellnurse 10.0 or 15.0 type)

Configuration	Solution observed in Japan	Points to study for the Mediterranean
Coast and maintenance ports	Kaiso-kun, port Shellnurse, seaweed farming in port	Shells from the Thau basin, combined with concrete; trials led by fishers; regulatory framework
Export cables (landfall)	No case observed	Cable protections designed as habitats

THREE CONDITIONS DRAWN FROM THE JAPANESE CASES

- **Enclosed cavities**: these are what attracted the spiny lobsters at Chōshi.
- **A full protocol from deployment**: baseline survey, control site, multi-year monitoring, published data.
- **Fishers involved** in manufacturing, deployment and monitoring, as with the Shellnurse and Kaiso-kun.

ANNEX G

Japanese scientific publications and technical reports

This annex lists work published in Japan on the reef effect of offshore wind turbines, shell reefs and fisheries monitoring, as well as SDI's presentations. The five references most useful to the FISHWIND project are summarised first.

Search carried out in October 2026 in J-STAGE (the Japanese scientific journals platform), international publishers' databases and the SDI website. We found no scientific article authored by Mr Shibuya: his results are presented in reports submitted to project owners, at conferences and in the trade press.

G.1 The five most important studies

1 · GOTŌ'S FLOATING TURBINES ATTRACT HORSE MACKEREL

Tsuchida S., Kato R., Nishitsuji S. *et al.*, Yagi M. (2025). *Floating offshore wind farms attract Japanese horse mackerel.* Aquatic Conservation: Marine and Freshwater Ecosystems. doi:10.1002/aqc.70189

The Nagasaki University team analysed 115 water samples taken year-round near the Gotō wind farm and at control stations. DNA of Japanese horse mackerel (*Trachurus japonicus*) is present in 83% of samples, with markedly higher concentrations near the turbines (up to 2,280 copies per litre, against a maximum of 783 at the control stations). The presence of the turbines explains these differences better than temperature or depth: this is evidence of a reef effect.

2 · MORE A REDISTRIBUTION IN THE WATER COLUMN THAN A GAIN IN FISH

Tsuchida S., Fujimoto S., Azmi S.S., Hirose M., Hirasaka K., Sato Y., Yagi M. (2026). *Three-dimensional redistribution of pelagic fish aggregations associated with floating offshore wind farms.* bioRxiv, preprint not yet peer-reviewed. doi:10.64898/2026.01.17.700020

The same team combined environmental DNA and a scientific echosounder at the Gotō commercial wind farm in 2025. It identified 126 fish species, with no significant difference in composition between the wind farm and the control area. Acoustic biomass is 11.5% higher near the turbines, though not significantly, but fish stay much closer to the surface there (about 88 m against 139 m). The authors speak of vertical redistribution rather than new production.

3 · KITAKYŪSHŪ'S FIXED-BOTTOM FOUNDATIONS ACT AS REEFS

Hamana M., Gonzalvo S., Otaki T., Komatsu T. (2025). *Development of a quantitative survey method for pelagic fish aggregations around an offshore wind farm using multibeam sonar.* Remote Sensing 17(18), 3255. doi:10.3390/rs17183255
Fukushima M., Tosha C., Ito Y. (2021). 北九州市沖における洋上風車基礎の有効利用に向けた魚礁効果調査 (reef effect of foundations off Kitakyūshū). Proceedings of the Wind Energy Symposium 43, 100-103. doi:10.11333/jweasympo.43.0_100

Using multibeam sonar, 97% of fish echoes are found in the area of the turbine and the met mast, against 3% in a control area 1 km away; estimated abundance there is about 67 times higher, with fish holding 60 to 100 m down-current of the structures (a single winter day). The 2021 study shows that fish, including horse mackerel, remain aggregated on the foundation even after the turbine has been dismantled, as it is covered with large seaweeds and prey.

4 · SHELL REEFS PURIFY THE WATER OF A PORT

Ohara H., Kamura S., Fujisawa S., Inoue H., Saito T., Tanaka T., Tahara M. (2013). 港湾内に設置した貝殻を使用した水質改善礁の機能の定量化 (quantifying the purifying effect of shell reefs in a port). Journal of JSCE, Ser. B3 (Ocean Engineering) 69(2), I_563-I_568. doi:10.2208/jscejoe.69.I_563

At the port of Tsuruga, sixteen steel reefs fitted with shell tubes host 88 to 120 species of small animals, 48 to 74% of them filter feeders. In tanks, they clarify the water in all seasons, less so in winter. The effect is valued at ¥4.55 million per year (≈ €24,600) in equivalent wastewater treatment costs.

5 · COMBINING SHELLS AND CONCRETE: AN EQUALLY EFFECTIVE, ALMOST CARBON-NEUTRAL MATERIAL

Kikuhara N., Ueno K., Ogasawara T., Yamada K., Awa M., Fujita D. (2012). 貝殻混じりセメント固化体の諸特性と藻礁への実用化に関する検討 (concrete with shell aggregates for seaweed reefs). Journal of JSCE, Ser. B3 (Ocean Engineering) 68(2), I_1109-I_1114. doi:10.2208/jscejoe.68.I_1109

Crushed scallop shells replace part of the aggregates. The concrete retains sufficient strength, can be placed on site and becomes covered with seaweed as much as an ordinary block. It costs about 4% more, but the carbon in the shells remains locked in the block. This is the most direct reference for making use of Thau basin shells in concrete structures.

G.2 Offshore wind, reef effect and fisheries

- Utsunomiya T., Sato I., Shiraishi T., Inui E., Ishida S. (2014). 浮体式洋上風力発電の実用化に向けて ―五島市椛島における実証事業― (the Kabashima demonstrator, Gotō). Journal of JSCE, Ser. B3 70(2), I_1-I_6. doi:10.2208/jscejoe.70.I_1

- Kitagawa K. (2015). 元気な自治体、五島 (Gotō, a dynamic municipality). Journal of the Japan Wind Energy Association 37(1), 111. Account from the city: small fish gathered as soon as the demonstrator was installed, followed by medium-sized and large fish; plans for floating reefs and action against isoyake with the cooperatives.
- Miyahara T., Makino F., Maeda O., Fukumoto Y. (2014). 銚子沖の洋上風力発電に係る環境影響調査 (environmental studies of the Chōshi demonstrator). Proceedings of the Wind Energy Symposium 36, 229-232. doi:10.11333/jweasympo.36.0_229
- Shima T. (2022). 洋上風力発電に係る漁業影響調査 (fisheries impact studies for offshore wind farms). Fisheries Engineering 58(3), 203-205. doi:10.18903/fisheng.58.3_203. Overview of monitoring methods and of how to respond to fishers' concerns; argues for studies adapted to local species.
- Sugimoto K., Nitta H., Kobayashi W., Yoshinaga K. (2024). 環境DNA及びRNAを用いた沿岸域の基盤の違いによる魚類蝟集効果の検証 (environmental DNA and RNA to compare fish attraction by substrate type). Journal of JSCE 80(17), 24-17246. doi:10.2208/jscejj.24-17246

G.3 Shell reefs and materials

- JF Zengyoren (2010). 貝殻利用技術「JFシェルナース」 (the JF Shellnurse technique). 4th technical meeting of the Nagoya Ports Bureau, Ministry of Land, Infrastructure, Transport and Tourism (MLIT), 26 October 2010.
- Imamura M., Sakai S., Kobayashi T. *et al.* (2026). 環境配慮型大型藻礁の開発と海域実証試験による機能性評価 (large seaweed reefs made from ash and shell powder). Journal of JSCE 82(18), 26-18066. doi:10.2208/jscejj.26-18066. Over 18 months at Ibusuki, as much or more seaweed than on an ordinary cement block.
- Kaiyo Kensetsu. JF Shellnurse brochures and list of studies (kaiyoh.co.jp): up to 80 times more prey than a flat element after 12 months, 284 times after 23 months (manufacturer's data, to be confirmed by the original publications).

G.4 SDI work and presentations

- SDI (2025). Three-year interim report on the marine environment and fisheries study linked to the offshore wind project off Chōshi, presented to the Chōshi fisheries cooperative on 24 April 2025 (unpublished report; reported in the Weekly Suisan Keizai Shimbun of 30 April 2025).
- Akita Prefecture (2024). SDI selected to film the reef effect of the foundations of the 33 turbines at the ports of Akita and Noshiro, and to produce a film for fishers (Wind Journal, 10 July 2024).
- Shibuya M. Talks: NEDO Challenge "for BLUE ECONOMY" (14 November 2025); Noshiro (11 June 2025); Chōshi Commercial High School (27 May 2025); Marine Diving Fair (7 April 2025).
- Press: Weekly Suisan Shimbun (interview, January 2026); Kensetsu Tsushin Shimbun (interview, 28 May 2025); Nikkan Suisan Keizai (3 August 2022); Nagasaki Shimbun (10 September 2019); Best Partner magazine, Hamagin Research Institute (July 2019).

KEY POINTS FOR FISHWIND

- Japanese studies confirm an **aggregation effect** of fish around turbines, both floating and fixed-bottom; new production remains to be demonstrated.
- The methods used (**environmental DNA, echosounder, multibeam sonar**) can be transferred to the monitoring of the AO6 and AO10 wind farms.
- **Shell concrete** is documented: it supports the Thau basin shells avenue.

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