

Never Forgetting, Striding Together into the Future, Higashimatsushima, United



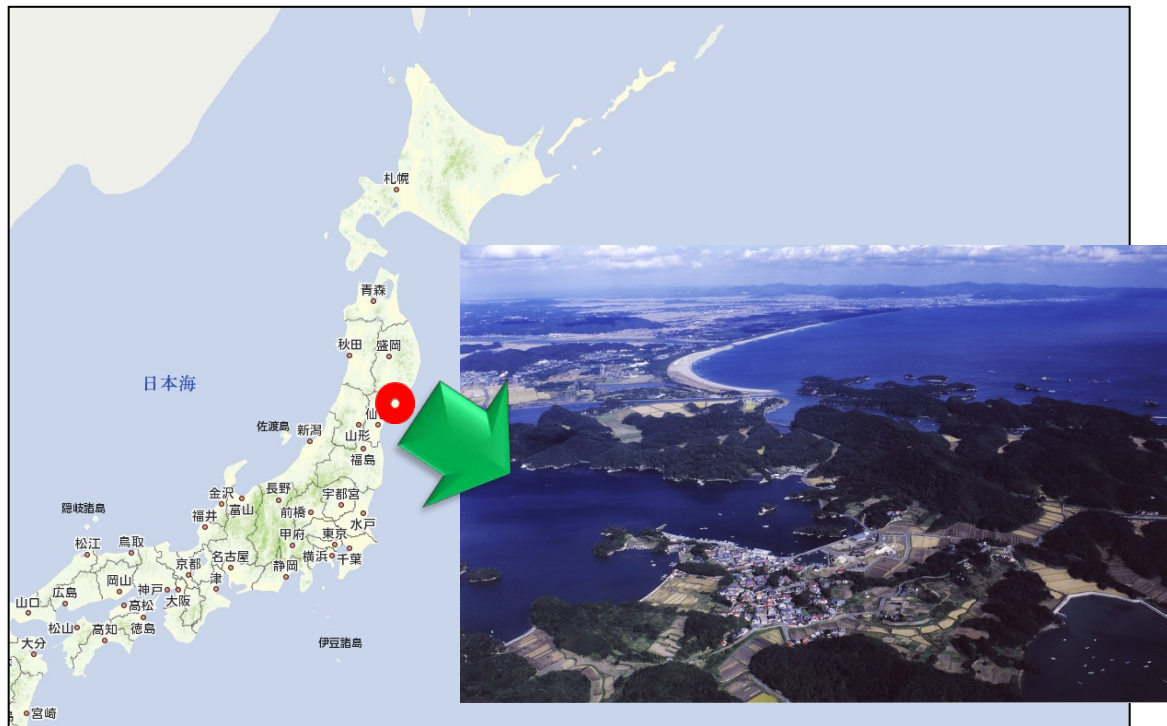
Higashimatsushima

Community Development for Recovery after the Great East Japan Earthquake





Overview of Higashimatsushima



[Location]

Higashimatsushima City is located in the northeast of Japan, bordering the Pacific Ocean. It is a scenic city that includes Matsushima, one of Japan's three great views. The JR Senseki Line and Sanriku Expressway run through the center of the city, and at only around 30 minutes from Sendai City, Higashimatsushima features convenient public transportation as a regional city.

[City flower: Cherry blossom]

[City tree: Pine]



[Experiences and Exchange]

Higashimatsushima City is blessed with nature, with spectacular views of the sea, mountains, and rivers. It is particularly rich in marine leisure opportunities, such as coastal swimming, clam digging, pleasure boat trips, and fishing. Prior to the earthquake disaster, it was visited by roughly 1.1 million people each year.

The Japan Air Self-Defense Force Matsushima Base holds an air show every summer, and airplane fans gather from around the country to see Blue Impulse fly.

■ Population: 40,183 (as of December 1, 2015)
(Population before earthquake: 43,142)



Air show (Blue Impulse)



Sagakei pleasure boat



**10 m 50 cm giant tsunami caused by
the Great East Japan Earthquake on March 11, 2011**

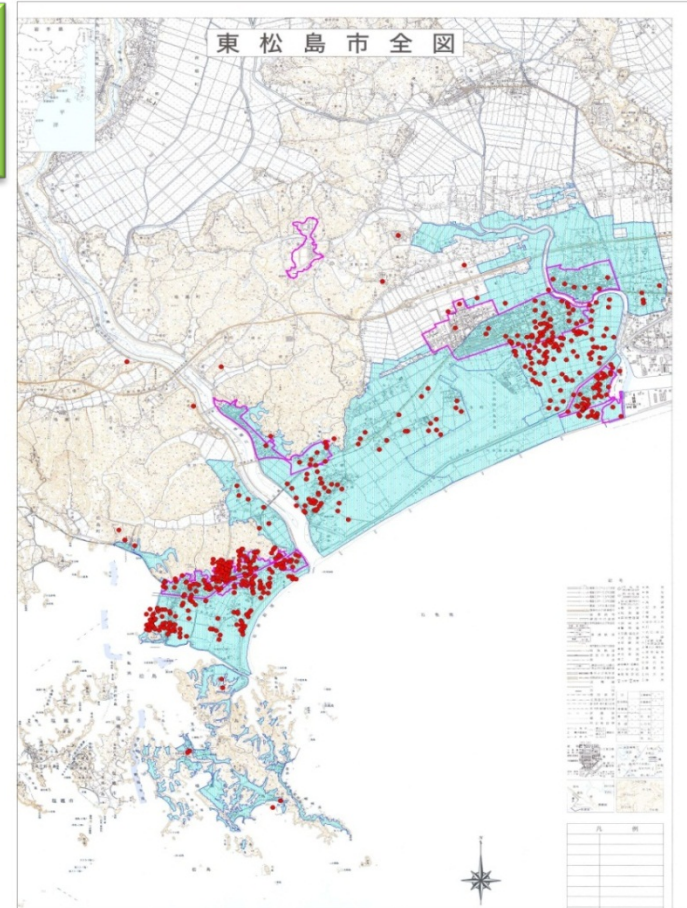


**Deaths/missing persons nationwide: 18,460
In Higashimatsushima: 1,134**

65% of the city's urban area was inundated by the tsunami (more than any other municipality in Japan)

Higashimatsushima damage conditions (as of end of August 2015)

- Human damages (city residents)
Deaths: 1,110
Missing persons: 24
Total: 1,134 (approx. 3% of the city's residents)
- Home damage
Completely destroyed: 5,513 homes
Partial but extensive destruction: 3,060 homes
Partially destroyed: 2,500 homes
Total: 11,073 homes
(Approx. 73% of all households)
- Evacuees (peak): 15,185
- Shelters (peak): 106
- Flooded agricultural area: 1,465 ha /
Total agricultural area: 3,349 ha



Promoting regional mutual assistance

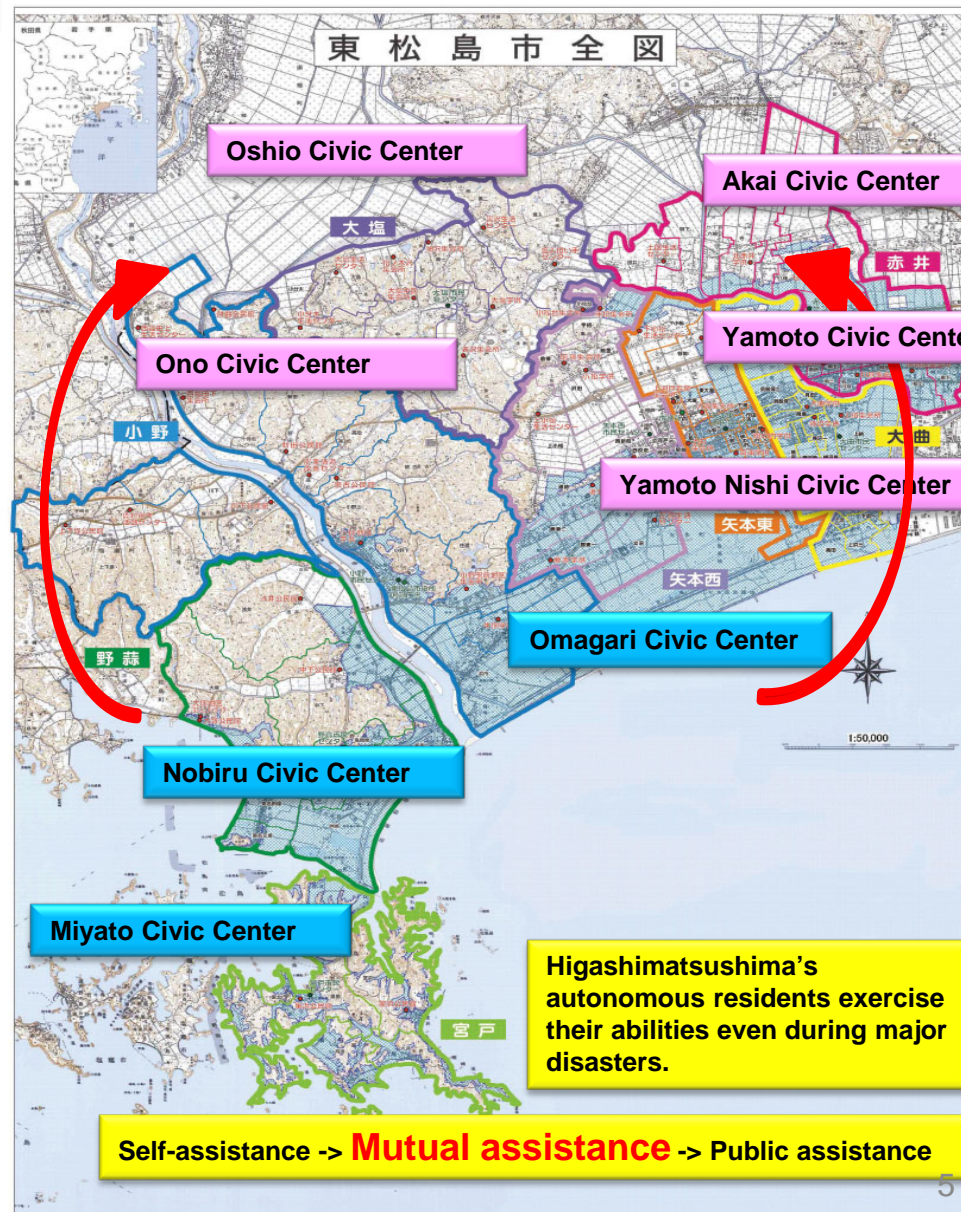
Higashimatsushima's unique regional autonomy framework

8 autonomous organizations, based on basic autonomous regulations

Autonomous organizations run shelters



Autonomous organizations support coastal areas



***Bonds between people* played an important role after Higashimatsushima suffered devastating damage.**

Higashimatsushima's autonomous residents exercise their abilities during disasters.

Self-assistance

Mutual assistance

Public assistance



Community development based on regionally decentralized autonomous cooperation, established prior to the earthquake disaster

Higashimatsushima style recycling of disaster waste

■ Disaster rubble volume: 1,098,000 tons
 Approx. 99% of all rubble was recycled.
 (110 times the annual waste production of Higashimatsushima)



(1) Rubble from destroyed houses and buildings is divided on-site into 14 categories

(2) Primary processing is performed using mobile construction machinery, etc.

(3) Painstaking manual sorting is used to ultimately process the rubble, sorting it into 19 categories

"Mixed, it's garbage, but separated, it's a resource"
 Industry, government, and residents (a local construction contractors association, the city of Higashimatsushima, and residents) worked together, preparing in advance to ensure that every region could achieve the project's goals.

■ Including a total of 2,160,800 tons of recycled tsunami sediment, **the recycle ratio of all disaster waste materials was 99.22%.**

Disaster rubble volume

| | |
|--|-----------------------|
| Wood / wood scrap: | 371,000 tons |
| Mixed garbage: | 79,000 tons |
| Concrete: | 404,000 tons |
| Asphalt: | 34,000 tons |
| Metal: | 25,000 tons |
| Unburnable mixed garbage: | 185,000 tons |
| Total: | 1,098,000 tons |
| (Recycled amt: | 1,073,000 tons) |
| (Incinerated amt [fishing nets/waste plastic]: | 28,000 tons) |
| (Amt difficult to process [asbestos, PCB, etc.]: | 3,155 tons) |

Unit cost of disaster waste processing contracted by Miyagi Prefecture

| | Project costs (millions of yen) | Processed amount (1,000 tons) | | | Processing unit cost (10,000 yen per ton) |
|--------------------|---------------------------------|-------------------------------|--------------|---------------|---|
| | | Rubble | Dirt | Total | |
| Kesennuma | 113.893 | 1,138 | 839 | 1,977 | 5.8 |
| Minamisanriku | 32.982 | 556 | 167 | 723 | 4.6 |
| Ishinomaki | 194.230 | 3,589 | 736 | 4,326 | 4.5 |
| Onagawa | 17.297 | 577 | 0 | 577 | 3.0 |
| Higashi Matsushima | 58.067 | 1,098 | 2,161 | 3,259 | 1.8 |
| Shiogama | 15.863 | 239 | 10 | 249 | 6.4 |
| Shichigahama | 16.688 | 228 | 304 | 532 | 3.1 |
| Tagajo | 15.222 | 242 | 108 | 350 | 4.3 |
| Natori | 31.799 | 741 | 222 | 963 | 3.3 |
| Iwanuma | 25.860 | 473 | 154 | 627 | 4.1 |
| Watari | 47.876 | 495 | 361 | 856 | 5.6 |
| Yamamoto | 43.888 | 784 | 856 | 1,641 | 2.7 |
| Total | 613.665 | 10,160 | 5,919 | 16,079 | 3.8 |

[Note] Processed amounts are rounded to whole numbers, so totals may not match.

Source: Kahoku Shimpo (July 6, 2014)

New plans for *recovery*

Two plans are being implemented simultaneously: a recovery plan and the FutureCity Initiative



Great East Japan Earthquake



Declining birth rate / graying society

Environment

(1) Recovery plan
Built Back Better Plan

(2) “FutureCity Initiative”
Future City Initiative

Build **Higashimatsushima** so that it can continue to develop

Simple *recovery*

A city still facing challenges such as energy supply, declining birth rate / graying society, and disaster prevention countermeasures

Higashimatsushima Organization for Progress and Economy, Education, Energy (HOPE)

Higashimatsushima Organization for Progress and Economy, Education, Energy



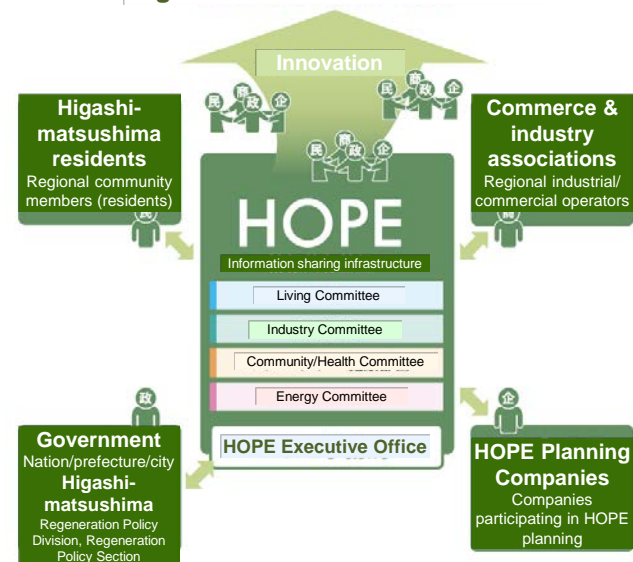
Founding objective

Promoting the concept of a sustainable *FutureCity*

Promoting the implementation of leading projects based on Higashimatsushima recovery community development plans

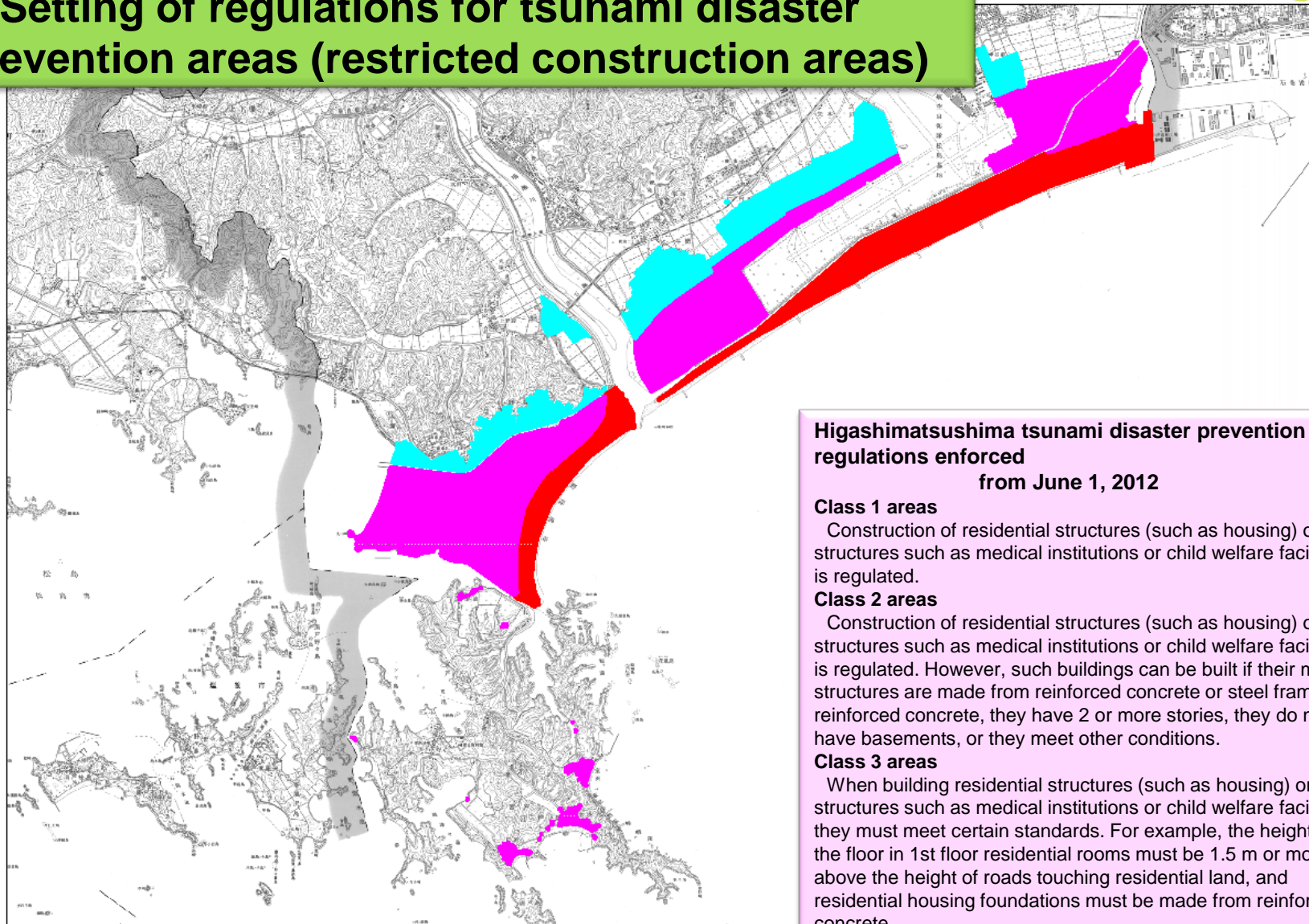
A recovery-related intermediary support organization formed by *industry, academia, government, and residents*

Higashimatsushima of the future



50 companies including enterprises, research institutions, and NPOs outside of the city provide their support

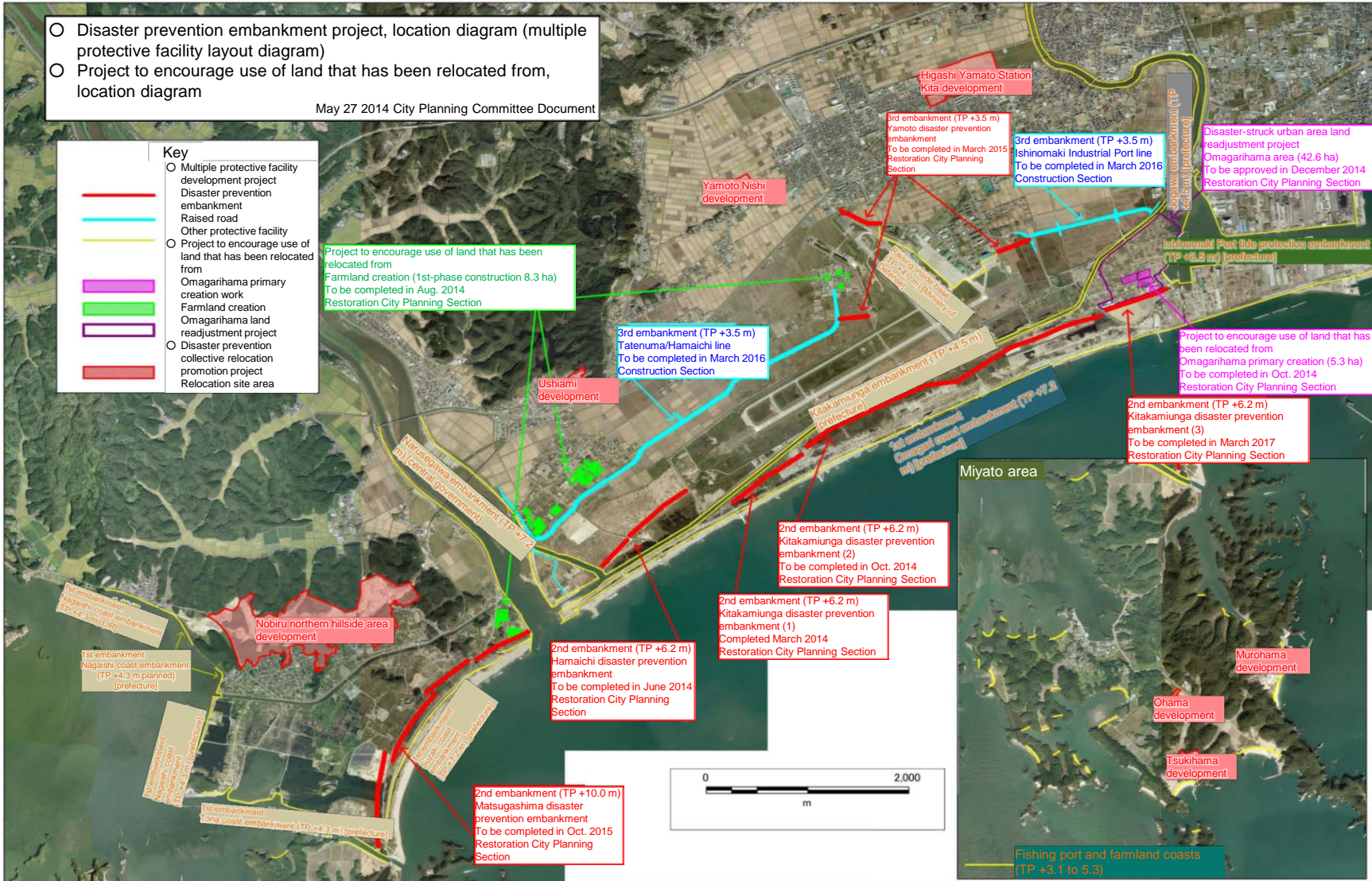
Setting of regulations for tsunami disaster prevention areas (restricted construction areas)



Higashimatsushima tsunami disaster prevention area regulations enforced from June 1, 2012

- Class 1 areas**
Construction of residential structures (such as housing) or structures such as medical institutions or child welfare facilities is regulated.
- Class 2 areas**
Construction of residential structures (such as housing) or structures such as medical institutions or child welfare facilities is regulated. However, such buildings can be built if their main structures are made from reinforced concrete or steel frame reinforced concrete, they have 2 or more stories, they do not have basements, or they meet other conditions.
- Class 3 areas**
When building residential structures (such as housing) or structures such as medical institutions or child welfare facilities, they must meet certain standards. For example, the height of the floor in 1st floor residential rooms must be 1.5 m or more above the height of roads touching residential land, and residential housing foundations must be made from reinforced concrete.

Disaster mitigation through defense in depth



A city that will be safe in the future (disaster prevention collective relocation diagram)

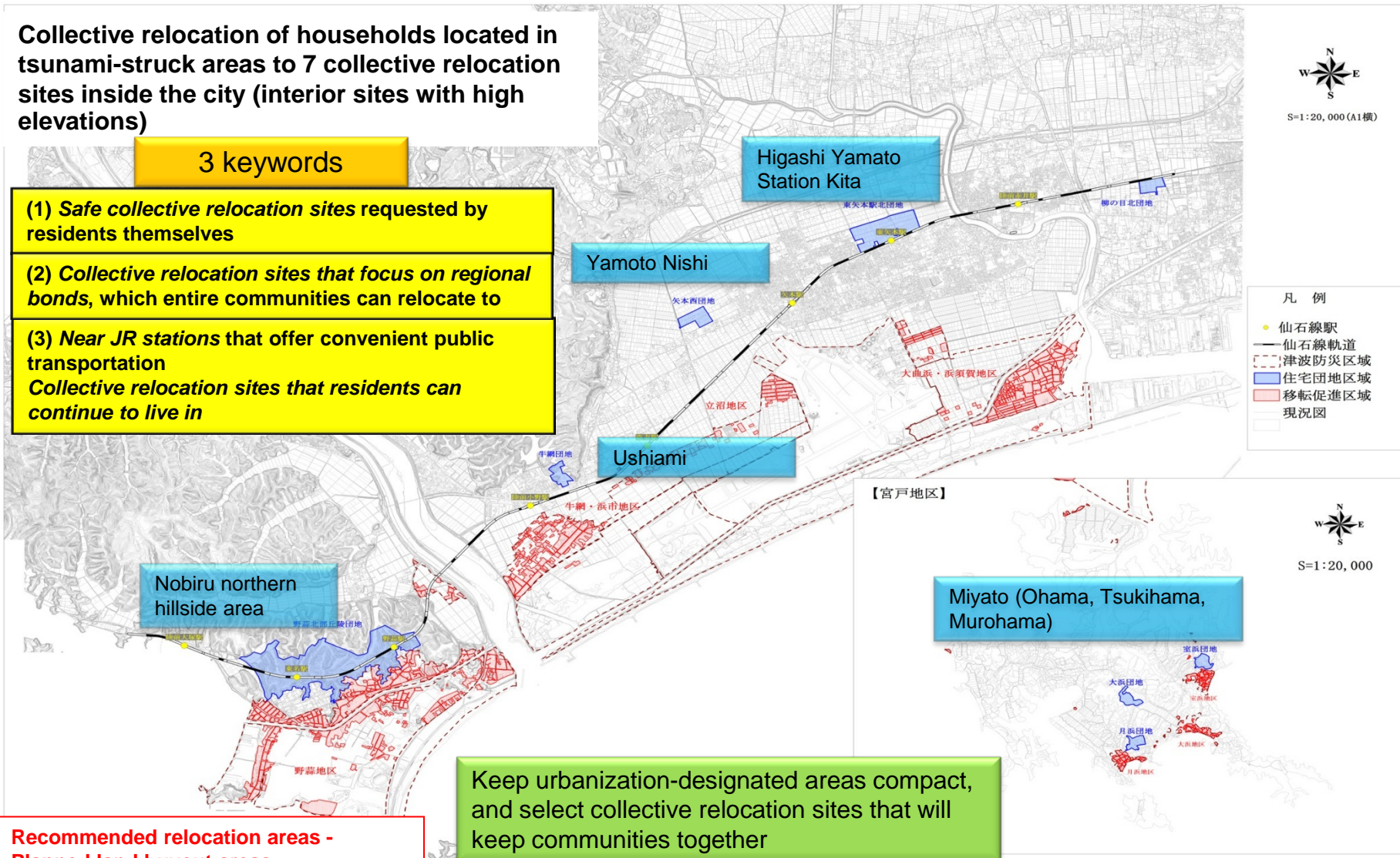
Collective relocation of households located in tsunami-struck areas to 7 collective relocation sites inside the city (interior sites with high elevations)

3 keywords

(1) *Safe collective relocation sites requested by residents themselves*

(2) *Collective relocation sites that focus on regional bonds, which entire communities can relocate to*

(3) *Near JR stations that offer convenient public transportation*
Collective relocation sites that residents can continue to live in



Keep urbanization-designated areas compact, and select collective relocation sites that will keep communities together

Recommended relocation areas - Planned land buyout areas
Overall area of approx. 230 hectares

Making progress on building homes with residents

1. Establishment of disaster prevention collective relocation sites (planned single-family housing zones)

7 collective relocation sites: During the disaster prevention collective relocation project for a total of 1,285 units (including 717 planned single-family housing zones), 528 planned single-family housing zones have been completed, for a completion rate of 73.6%. There was a construction completion rate of approximately 82% for the 5 sites completed last year.

Completed housing developments



Yamoto Nishi: 127 divisions (including 87 single-family housing divisions)



Ushiami: 74 divisions (including 45 single-family housing divisions)



Murohama: 22 divisions (including 9 single-family housing divisions)



Tsukihama: 22 divisions (including 18 single-family housing divisions)



Ohama: 15 divisions (including 10 single-family housing divisions)



Higashi Yamato (single-family): 273 divisions

2. Establishment of disaster public housing

(1) Currently developing a total of 1,010 public housing units.

(2) 604 have been completed, and families have already moved in. Completion rate: 59.8%

(3) Careful adjustment of intentions with resident organizations such as the Relocation Committee resulted in an occupancy rate of 98%.

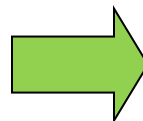


Housing complex

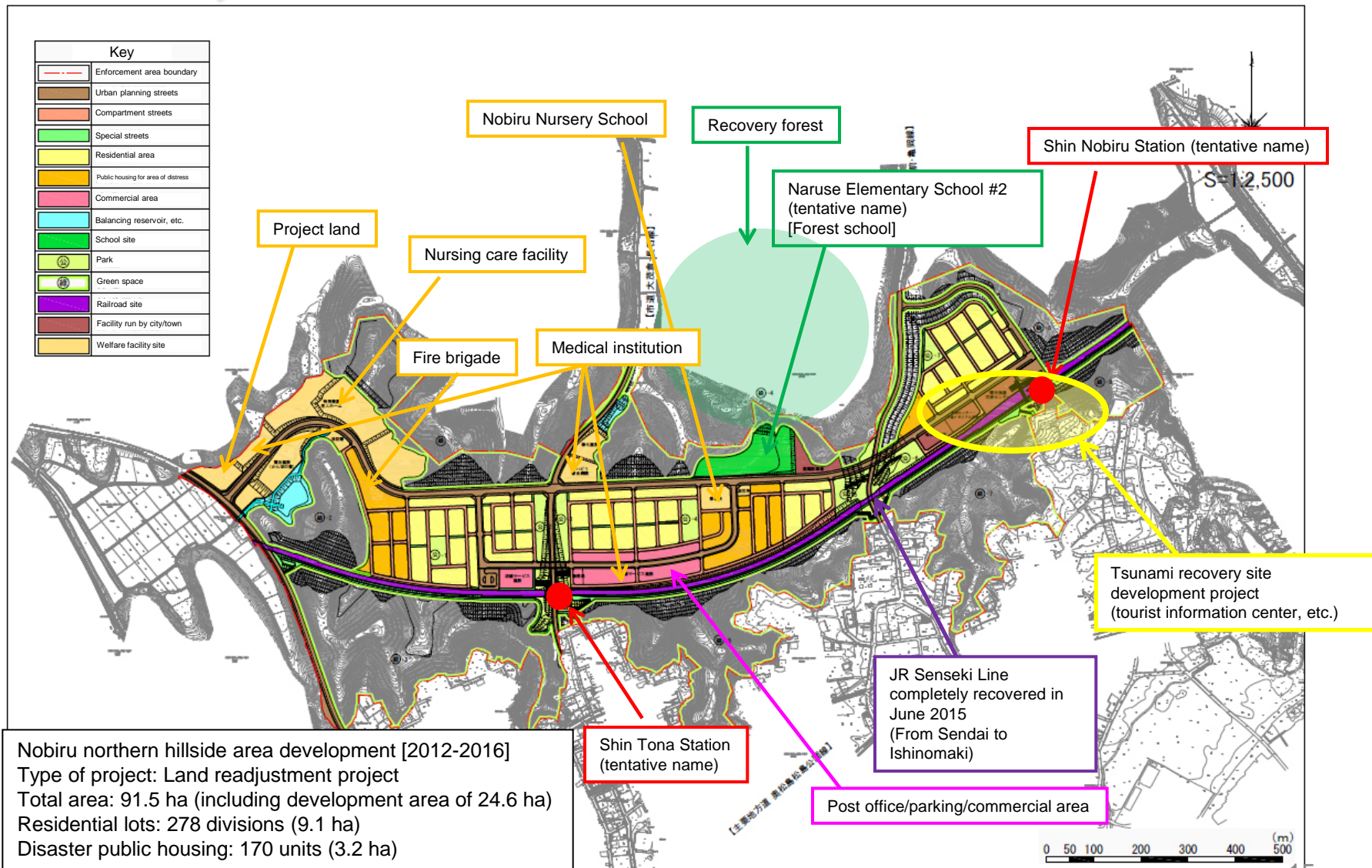


Single-family housing

Farmland conversion by making use of residential areas damaged during disasters



Nobiru northern hillside area (model area for town-wide relocation)



Nobiru northern hillside area development [2012-2016]
 Type of project: Land readjustment project
 Total area: 91.5 ha (including development area of 24.6 ha)
 Residential lots: 278 divisions (9.1 ha)
 Disaster public housing: 170 units (3.2 ha)

["FutureCity" Initiative Vanguard Project]



Oku-Matsushima “Kizuna” Solar Park: First in a tsunami flooded area
Higashimatsushima “Kizuna” Carport Solar Power: Making use of public facility roofs

Oku-Matsushima “Kizuna” Solar Park

- (1) Operator: Resident fund
- (2) Planned area: Part of Higashimatsushima Oku-Matsushima public part site (approx. 47,000 m²)
- (3) Linked capacity: **1,990 Kw (approx. 2 megawatts)**
- (4) Power generation: Approx. 2.1 million Kwh/year
(roughly the amount of power used by around 600 regular households in a single year)



This power station was featured in the Financial Times (which is distributed all over the world), in the article **“Providing Power... and Hope.”**

Higashimatsushima “Kizuna” Carport Solar Power

- (1) Operator: Resident fund
- (2) Planned land, etc.:
 - Parking lot in front of Community Center (approx. 180 Kw)
 - Takagi Woods Athletic Park parking lot (approx. 63 Kw)
 - Oshio Civic Center parking lot (approx. 26 Kw)**Total: Approx. 269 Kwh**

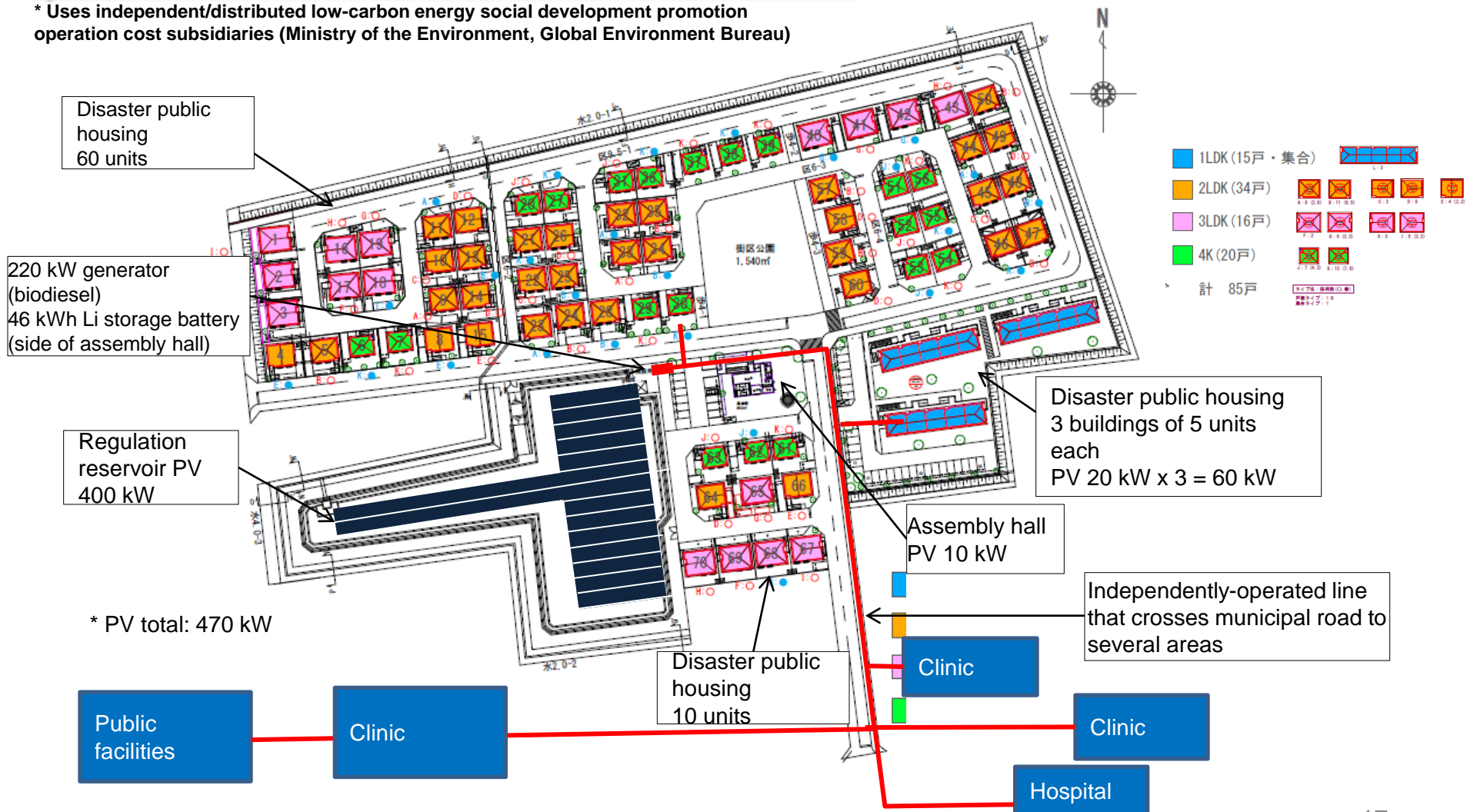


In addition to power generation operators, carport solar power can provide power to residents as a distributed power station during an emergency or disaster. Power is provided along with parking, providing two benefits at the same time.

["FutureCity" Initiative Vanguard Project]

Higashimatsushima intelligent disaster prevention eco-town

* Uses independent/distributed low-carbon energy social development promotion operation cost subsidiaries (Ministry of the Environment, Global Environment Bureau)



Higashimatsushima: Toward becoming a FutureCity

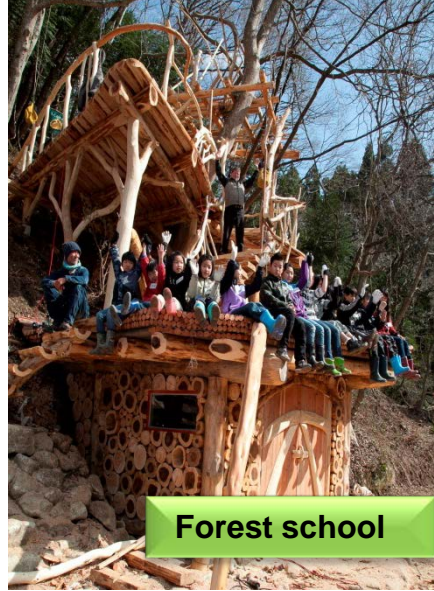


Shin Nobiru Station

Kizuna megasolar



Tsunami monitoring cameras



Forest school

**Nobiru northern hillside area
Collective relocation
creation area**



Medical institution, etc.



Miyanomori Elementary School: the forest school