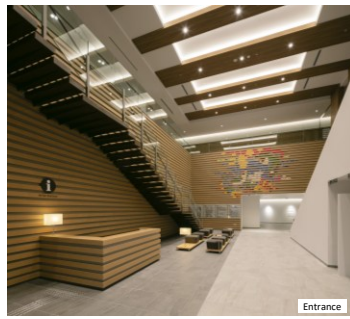


Low-Carbon Transition Case 1 : Japanese Red Cross Kochi Hospital



1. Facility Overview and Funding / Subsidies

Location: 1-4-63-11 Hadaminami-cho, Kochi Prefecture (16 minutes on foot from JR Kochi Station; 12 minutes by public transportation)
Operated by: Japanese Red Cross Society
Facility Certifications / Designations: Regional Disaster Base Hospital, Regional Medical Support Hospital, Emergency and Critical Care Center (among others)

【Construction Cost and Subsidies】
Total Cost : Approximately JPY 20 billion
 Subsidy for Promoting Investment in Energy Conservation | JPY 810 million
 Prefectural Subsidy for Modernization of Medical Facilities | JPY 330 million
 Prefectural Subsidy for Emergency and Critical Care Center Facility Development | JPY 70 million
 Prefectural Subsidy for Regional Disaster Base Hospital Facility Development | JPY 10 million
 Prefectural and Municipal Repayment Cost Subsidy (20-year projected amount) | JPY 1.24 billion

Founded in 1928 as the Kochi Prefecture Branch Clinic of the Japanese Red Cross Society, the facility was renamed Kochi Red Cross Hospital in 1933. As a core regional general hospital, it provides 24-hour emergency and advanced medical care, while delivering seamless services ranging from health checkups to preventive care.

	Previous Hospital	New Hospital
Completion Date	Renovated and expanded in 1995	March 2019
Number of Beds	468 beds	403 beds
Site Area	10,254.95㎡	28,842.56㎡
Total Floor Area	26,112.66㎡ (including administrative building and on-site nursery)	32,849㎡ (including on-site nursery)
Structure	Main Building (steel reinforced concrete; 7 stories above ground with 1 basement level) South Building (steel reinforced concrete; 7 stories above ground with 1 basement level)	Seismic isolation, steel reinforced concrete with partial steel frame; 8 stories above ground
Floor Area per Bed	Approx. 55㎡	71.1㎡

2. Green Systems

Category	Technology	Innovative Approach	Direct Effects	Secondary Effects
Building Impact Reduction	Compact design (71.1 m ² per bed) / High-performance insulation (sprayed polyurethane foam, polystyrene foam) / Low-E insulated glass units / Cool tube	Corridors were lessened by streamlining circulation in common areas and reducing walls. Patient areas were designed to maintain openness through window placement and interior design. Insulation and window openings were optimized according to orientation. Stable underground temperatures were also leveraged.	Consistent reduction of annual heating and cooling demands / Reduce solar heat transfer and heat loss	Improved staff communication through the consolidation of shared spaces
Air Conditioning and Heating	Absorption chillers (gas/heavy fuel oil A switchable) / Air-cooled heat pump chiller (modular type) / VAV air conditioning units / High-efficiency packaged air conditioners	Fuel switching is based on price and disaster risk. Only necessary units operate during low load periods. Capacity is adjusted via inverter.	Improved partial load efficiency / Reduction of excessive air supply and ventilation / Reduction of peak power consumption	Enhanced resilience (fuel diversification) / Extended equipment lifespan by reducing unnecessary operation
Electricity and Hot Water Supply	Micro-cogeneration units (35 kW × 10 units) / Electric hot water heat pumps (various capacities) / High-efficiency transformers / LED lighting with motion, light, and time-based controls (sensor coverage >90%)	Multiple units are distributed, with operation adjusted seasonally and by time of day. Heat pumps are partially installed in mechanical rooms to reduce piping lengths. Lighting is managed to automatically shut off by default.	Lower primary energy use via on-site generation and waste heat recovery / Major reduction in lighting and standby losses / Alleviation of heat in mechanical rooms	Enables review of contracted power / Increased awareness of excessive lighting accelerates on-site improvements
Supervision Systems	BEMS (visualization by department and equipment) / Utilization of energy service providers	Visualize energy demand, operating hours, and peak periods, and optimize setpoints through seasonal PDCA cycles.	Early detection and correction of unnecessary operation / Peak reduction	Shortening the cycle for identifying improvement opportunities / Easier verification of effectiveness of measures

Low-Carbon Transition Case 1 : Japanese Red Cross Kochi Hospital

3. Implementation Plan and Overview

Beginning with the completion of the Main Building in 1957, the hospital underwent a series of expansions and renovations—including the construction of the North Building, extensions and refurbishments of the Main Building, and the construction of the South Building—resulting in a total of six new construction and renovation projects by 1995. While aging and space constraints continued to worsen, efforts to identify a suitable relocation site in the surrounding area faced significant difficulties.

March 2011 Great East Japan Earthquake

Following the earthquake, it was determined that the site of the former hospital was within an area projected to experience long-term flooding. In contrast, the redevelopment site of a former factory—identified as a potential relocation candidate—was found to have a lower flood risk. By coordinating with the planned relocation of a fire station designated as a disaster response base, it was concluded that the new site could provide enhanced wide-area disaster response capabilities. Consequently, the decision was made to relocate to this site.

2013 Construction of New Hospital Announced (Relocation and Reconstruction)

April 2014 Formulation of Basic Concept and Plan

November 2014 Selection of Design and Supervising Consultants

October 2015 Completion of Basic Design

October 2015 Selection of Energy Service Provider

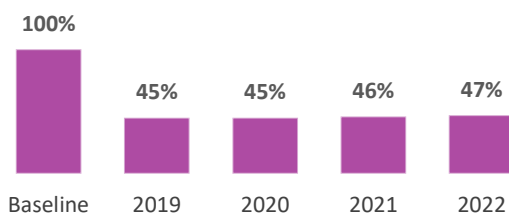
March 2017 Groundbreaking Ceremony for New Hospital Relocation and Construction

March 2017 Construction of New Hospital Begins

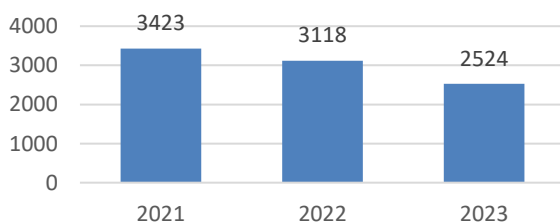
March 2019 Completion of New Hospital

May 2019 New Hospital Opens Former Hospital Sold (Land and Buildings)

Annual Energy Consumption (vs. Baseline)



CO2 Emissions from Energy Use (tCO2)



Disaster response was prioritized while making the building compact through design ingenuity. By reducing the total floor area, energy demands were lowered, maintenance was simplified, and operational efficiency was improved. Common area ratios were compressed to approximately 10% of total floor area (compared to the typical ~30%).

- Staff movement routes were minimized
- Major equipment was consolidated on areas such as rooftops to make effective use of interior space

【Catalyst for ZEB Implementation】

Although the basic plan had already been finalized, a proposal from the energy service provider prompted extensive discussions between the hospital, the design firm, and the service provider. Deliberations continued even after construction began, ultimately leading to a finalized plan.

【Achieving ZEB Ready】

For each system, energy reduction effects and cost-effectiveness were rigorously evaluated. Considering regulations and price levels at the time, the introduction of a large-scale solar power system was deferred due to limited economic feasibility. Instead, individual equipment was selected at the highest performance standards available at the time, and the overall design was carefully reviewed to avoid additional construction costs. Through the systematic elimination of inefficiencies, **ZEB Ready** was successfully achieved.

【Operational Innovations and Achievements】

Continuous monitoring and data management via the central control system (BEMS) enabled optimization by department, equipment, and season. Through iterative adjustments, energy consumption steadily decreased, reaching levels below those required for designated factories under the Energy Conservation Act. Contracted power capacity has also been gradually reduced. Furthermore, visualizing usage patterns has raised staff awareness, establishing a PDCA cycle of cause analysis and corrective action.

【Best Practices Sharing】

The hospital has already received numerous requests for site visits and information exchange and has been responding accordingly. Opportunities to present the project at academic conferences and other gatherings have also emerged, with proactive dissemination carried out not only by the hospital but also by the design and construction firms involved. Within the Japanese Red Cross Group, consideration is being given to scaling across other sites.

Lessons Learned and Key Messages

With disaster response identified as the highest-priority, it is essential to ensure close coordination with regional disaster management from the site selection stage. By incorporating the necessary elements for decarbonization from the early design phase, rework and additional investments in later stages can be avoided, allowing the overall project cost to be controlled while smoothly advancing the process from planning through construction. A compact design that carefully examines required functions reduces unnecessary floor area and equipment, not only lowering initial investment but also designing for smaller future energy demand, thereby simultaneously reducing long-term operational costs and environmental impact.