



## Contact

Sustainable Hydropower Website  
C/- Hydro Tasmania  
4 Elizabeth St  
Hobart TAS 7000  
AUSTRALIA

[sustainable.hydropower@hydro.com.au](mailto:sustainable.hydropower@hydro.com.au)

# Heritage

## Kurobe River, Japan

The refurbishment of six power stations along the Kurobe River System, Japan, involved significant effort to create architecture that blended and harmonised with existing buildings and their surroundings.

### Overview

The Kurobe River originates in Mt. Washibadake in the center of the North Japan Alps and flows through the eastern part of the Toyama Prefecture into the Toyama Bay. It is one of the largest rivers in the Hokuriku region, with a catchment area of 682 km<sup>2</sup> and a total channel length of 85 km. The river runs between the steep Tateyama Mountain Range and Ushiro Tateyama Mountain Range, gathering numerous tributaries, and reaching a plain approximately 14 km upstream of the estuary, where the Aimoto Dam is now sited.

In the early 1990's, the Hokuriku Electric Power Company closed and rebuilt six power plants along the lower reaches of the Kurobe River and irrigation system. As a result, the number of turbines was reduced from 13 to 6 with the installation of a single, more efficient unit at each plant. Whilst this reduced operating costs, it also resulted in a 5MW increase in generating capacity, giving the scheme a total of 33.2 MW installed capacity. The refurbishment was complete by 1993, coinciding with full-scale refurbishment of the main irrigation channel by the Hokuriku Agricultural Administration Office of the Ministry of Agriculture, Forestry and Fisheries.

### Dam Name

<b>Scheme operator</b> Hokuriku Electric Power Company	<b>Size of scheme (MW)</b> 33.2
<b>Country</b> Japan	<b>Catchment area</b> 682 km <sup>2</sup>

**River**  
Kurobe River Basin

**Effective reservoir capacity**

**Construction years**  
1990-1993

**Reservoir size**

### **External recognition**

The Kurobe Power Scheme reconstruction was awarded the (then) Ministry of International Trade and Industry Good Design Award (P facility class, 1994).

### **Details**

The redevelopment of 6 power plants in the Kurobe Basin took into consideration the aesthetic character of the surroundings to ensure harmony with the adjacent landscape.

At Kokutou Power Plant No.3 the local municipality planned to use the old power plant building as a museum. The exterior appearance of the new power plant building was made to resemble that of the old building, creating an impression that the two structures were built as a pair. Particular attention was paid to reproducing the shape of the roof (gabled monitor roof) and external wall of the old building. A sprayed finish on reinforced concrete gives the appearance of brick-wall construction, matching the stained masonry of the original structure. Careful matching of the color requirement weathering of color pigments prior to application. Reproduction ornaments at roof corners, external openings and columns resemble those of the old power plant building.

Kurobe Power Plant No.4 featured a gabled roof that was valued by the local community, hence the style was re-created for the new power plant using a gabled Japanese tiled roof, ensuring the design was compatible with surrounding homes.

The Kokusei No.2 and No.3 power plants are visible from the Hokuriku Expressway and other roads in the area, and boast a striped design similar to the existing power plant buildings. A simple flat roof and large windows high up in the buildings were intended to create a more attractive appearance.

The Kokutou Power Plant No.1 features a streamlined design and flat roof to create a sense of unity with the neighboring park management office.

In addition to the architectural design of the buildings, penstocks, head tanks and other facilities at the new power plants have been constructed alongside those of the old power plants at new and old power plants, providing an aesthetically pleasing succession from old to new.

### **Other aspects**

#### [Multiple use benefits](#)

Following the creation of a new powerhouse, the local Nyuzen-machi municipality rebuilt the interior of the old Kurobe River No. 2 Power Plant to house the Nizayama

Forest Art Museum (Nyuzen-machi). The gallery houses water wheels, generators, control panels and other equipment used in the old power plant, thus capturing the historic atmosphere of the plant.

#### [Energy system benefits](#)

Reconstruction of power plants along the Kurobe River has enabled system operators to utilise more modern and efficient turbines, resulting in reduced maintenance with higher generation capacity than was previously installed.

#### **Further information**

Source: Hydropower Good Practices Workshop, Annex VIII - Examples for Good Practice Report, Villach, Austria, October 2005. International Energy Agency.

<http://www.kepco.co.jp/english/index.html>