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Resource Use

BC Hydro, Canada

Overview

The Columbia River is situated in the northwest of the United States of America. It has many tributaries, several of which originate in the Canadian Rockies. The Grand Coulee scheme on the Columbia River was initiated under the “New Deal” *National Industrial Recovery Act* of 1933 and first commissioned in 1942. The original design called for 18 units, the last of which came on line in 1950.

One of the reasons for the project’s proposal was that it would provide jobs for the unemployed during construction. The project was designed to deliver both hydropower production and water for irrigation. The original intent was to irrigate up to one million acres - about half this area is currently irrigated. The scheme also provides recreational opportunities, flood control, fish and wildlife benefits.

Scheme Specifications

Dam Name

Scheme operator

Bonneville Power Administration USA

Size of scheme (MW)

Initially 1575 MW in 1941 increasing to 6500 MW today

Country

USA

Catchment area

191 920 ha

River

Columbia River

Effective reservoir capacity

154 125 million m³

Construction years

1933 - 1951 and 1965 - 1975

Reservoir size

260 square kilometres

Details on sustainability aspect

Longevity of benefits

Since commissioning in 1942 the scheme has been upgraded several times. From the original design's 1575 MW capacity, the scheme now produces almost 6500 MW. About 650 MW of extra capacity was added through installation upgrades between 1967 to 1974 and 1982 to 1988. The six generators of the 'Third Powerplant', the last to be commissioned in 1975, added a further 4 215MW capacity to the scheme. Generation is around 21 million megawatt hours per year.

Refurbishment is still taking place with the replacement of the original generators 1 to 18, relays and power circuit breakers. Contractors are replacing turbine runners at a rate of 3 to 4 units per year. Other upgrade activities include replacement of old lead covered control cable and control systems.

Efficiency gains have resulted from refurbishment of runners with the output of one unit increasing from 92% to 95.6% at 323 feet of head. Similar gains are anticipated for other units as refurbishment progresses.

Other Aspects

Multiple use benefits

The Grand Coulee Dam was established as a multiple use scheme providing for flood control, irrigation, hydropower and recreation. In addition to electricity production the scheme provides water for the irrigation of some 200 000 ha of land.

Biodiversity and threatened species

Water releases from the Grand Coulee play a significant role in providing water for fish that have been listed under the Endangered Species Act.

Erosion and sedimentation

The plant is used by the Bonneville Power Company to supply peaking capacity, but operating in this mode has required substantial downstream stabilisation measures to maintain riverbank stability.

Further Information

WCD Case Study, Grand Coulee Dam and the Columbia Basin Project USA, November 2000.

<http://www.dams.org/kbase/studies/us/>

<http://www.usbr.gov/power/data/sites/grandcou/grandcou.pdf>