

**ENVIRONMENTALLY SUSTAINABLE
HYDRO POWER LOCATED IN
FAR NORTH QUEENSLAND**

Barron Gorge

Hydro



> About the project

Barron Gorge Hydro generates clean, green electricity and was commissioned in 1963. It has a maximum capacity of 60 megawatts (MW) which is bid into the national electricity market. As the most northern generation site on the Queensland electricity grid, it plays a particularly important role in providing security of electricity supply to regional consumers by controlling voltage levels on the transmission system.

In 2005, Barron Gorge Hydro underwent a mid-life refit, the largest project undertaken at the power station since its original construction. The \$28 million upgrade extended the economic life of the hydro for another 40 years.

> Water supply

On its way to the sea, the Barron River drains 1,900 square kilometres of the Atherton Tableland and descends more than 280 metres to the coastal plain. This water flows into Kuranda Weir, which has a capacity of 1,500 million litres and acts as a regulating pond for Barron Gorge Hydro. Additional water can be obtained for hydro generation from Tinaroo Dam, an irrigation storage dam on the Atherton Tableland, controlled by SunWater. Water from Tinaroo Dam flows approximately 80 kilometres before it reaches Kuranda Weir.

> Environment

Hydro-electric generation (using the energy of moving water to drive generators) is one of the cleanest and most efficient methods of producing electricity. Barron Gorge Hydro does not emit any greenhouse gases and is one of only a few power generation facilities in Queensland able to supply green power. It operates within a certified ISO 14001 Environmental Management System and is an accredited green generator.

> Community and tourism

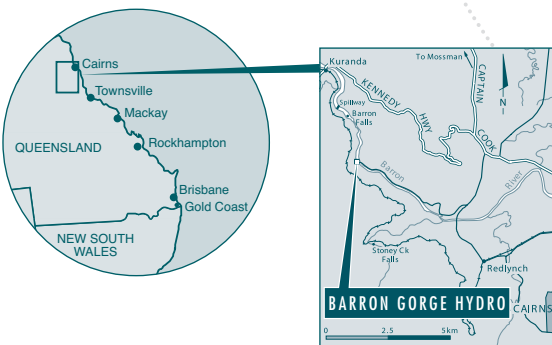
Barron Gorge Hydro plays an important role in supporting the tourism industry of Far North Queensland. It is one of Queensland's most-visited power stations, attracting approximately 15,000 visitors a year. The Barron Gorge Hydro Visitors' Centre is open to the public seven days a week and provides information about the power station, Stanwell's other generating sites and surrounding area.

About Stanwell

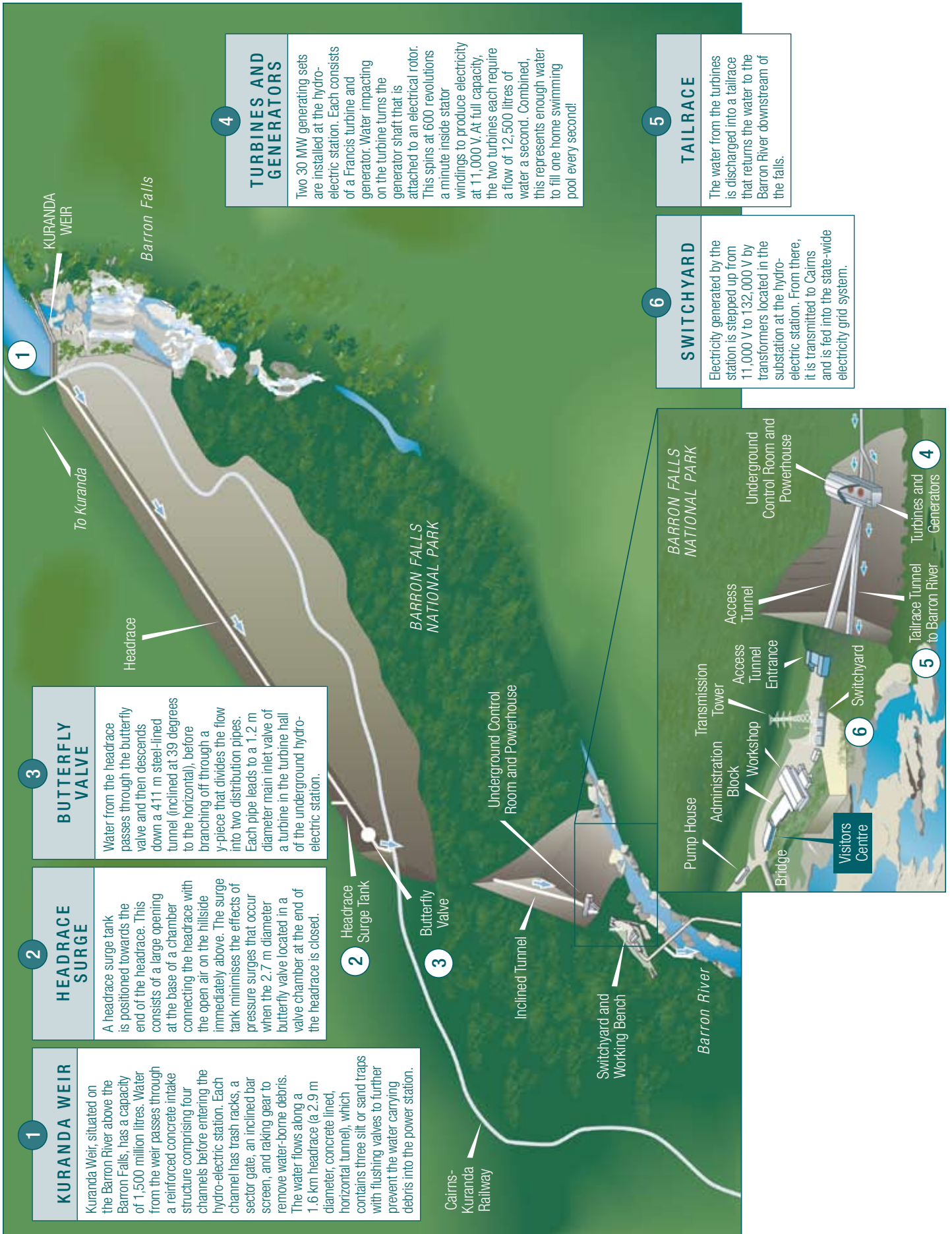
Stanwell is a Queensland Government owned corporation with an energy portfolio comprising coal and hydro facilities throughout Queensland. Currently, Stanwell trades more than 30 per cent of the State's electricity requirements. Our vision is to deliver **smarter energy** for Queensland.

Statistics

Capacity	60 MW
Greenhouse Gas Savings	260,000 tonnes per year
Powered Equivalent	600,000 x 100 watt light bulbs
Commissioned	1963



Barron Gorge Hydro is located in the Wet Tropics World Heritage Area on the Barron River, 20 kilometres north-west of Cairns, in Far North Queensland.



1 KURANDA WEIR
Kuranda Weir, situated on the Barron River above the Barron Falls, has a capacity of 1,500 million litres. Water from the weir passes through a reinforced concrete intake structure comprising four channels before entering the hydro-electric station. Each channel has trash racks, a sector gate, an inclined bar screen, and raking gear to remove water-borne debris. The water flows along a 1.6 km headrace (a 2.9 m diameter, concrete lined, horizontal tunnel), which contains three silt or sand traps with flushing valves to further prevent the water carrying debris into the power station.

2 HEADRACE SURGE
A headrace surge tank is positioned towards the end of the headrace. This consists of a large opening at the base of a chamber connecting the headrace with the open air on the hillside immediately above. The surge tank minimises the effects of pressure surges that occur when the 2.7 m diameter butterfly valve located in a valve chamber at the end of the headrace is closed.

3 BUTTERFLY VALVE
Water from the headrace passes through the butterfly valve and then descends down a 411 m steel-lined tunnel (inclined at 39 degrees to the horizontal), before branching off through a y-piece that divides the flow into two distribution pipes. Each pipe leads to a 1.2 m diameter main inlet valve of a turbine in the turbine hall of the underground hydro-electric station.

4 TURBINES AND GENERATORS
Two 30 MW generating sets are installed at the hydro-electric station. Each consists of a Francis turbine and generator. Water impacting on the turbine turns the generator shaft that is attached to an electrical rotor. This spins at 600 revolutions a minute inside stator windings to produce electricity at 11,000 V. At full capacity, the two turbines each require a flow of 12,500 litres of water a second. Combined, this represents enough water to fill one home swimming pool every second!

5 SWITCHYARD
Electricity generated by the station is stepped up from 11,000 V to 132,000 V by transformers located in the substation at the hydro-electric station. From there, it is transmitted to Cairns and is fed into the state-wide electricity grid system.

6 TAILRACE
The water from the turbines is discharged into a tailrace that returns the water to the Barron River downstream of the falls.

