

HYDROPOWER

It's thanks to hydropower that Cape Town suburbs are often spared the inconvenience of load-shedding – for example, if Eskom has announced Stage 2 load-shedding, municipality-supplied electricity consumers may only be subject to Stage 1. This is because Cape Town's municipality owns its own hydroelectric facility, the 180 MW Steenbras Hydro Pump Station. As its name suggests, it's a pumped storage scheme, the very first in Africa when commissioned in 1979.

In pumped storage schemes, the hydroelectric power plant is situated on a waterway linking an upper and lower reservoir. Electricity is generated when water flows from the upper to the lower reservoir, in this case from the Steenbras Dam – partly visible from the N2 at the top of Sir Lowry's Pass – through a series of tunnels down the mountain to a small reservoir 300 m below. Just before reaching the lower reservoir, which is situated on the outskirts of Gordon's Bay, the water flows through four 45 MW reversible pump-turbines for electricity generation. During off-peak periods, when demand for electricity is low, water is pumped back up to the Steenbras Dam.

Eskom has three of its own pumped storage schemes: the smallest is the 400 MW Palmiet scheme that lies adjacent to the Steenbras scheme, the oldest is the 1 000 MW Drakensberg scheme, and the newest and largest is the 1 332 MW Ingula scheme, also in the Drakensberg.



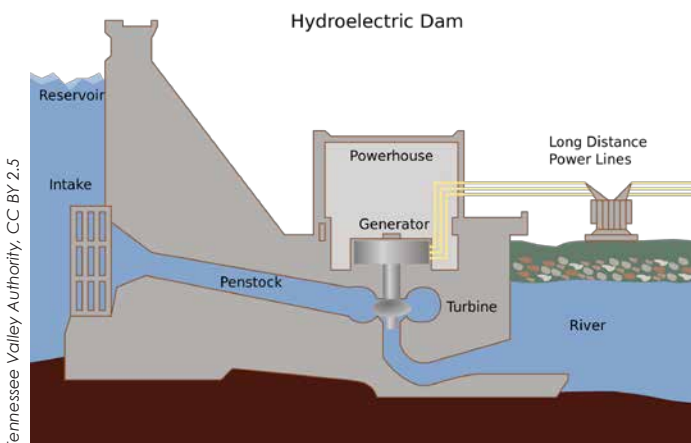
City of Cape Town

The Steenbras Dam forms part of the City of Cape Town's water supply system, but is also used for electricity generation when water is channelled down to the small reservoir on the outskirts of Gordon's Bay.

In addition, Eskom has a number of conventional hydropower schemes that are either storage-regulated systems with a dam or run-of-river systems relying on the river's natural flow and 'fall', typically with water temporarily diverted from the watercourse. The former includes the 360 MW Gariep and 240 MW Vanderkloof schemes on the Orange River. The 42 MW Collywobbles scheme on the Mbashe River, commissioned in 1985 by the former Transkei Electricity Corporation (TESCOR), has a small dam but is a run-of-river system, where water is channelled through the mountain separating two bends of the river. This means that it takes a fast shortcut of 1.4 km down to the power plant, instead of slowly flowing 34 km through the winding watercourse. Eskom also operates three other former TESCOCOR hydropower stations – the 6 MW First Falls and 11 MW Seconds Falls stations on the Mthatha River and the 2.4 MW Ncora station on the Tsomo River.

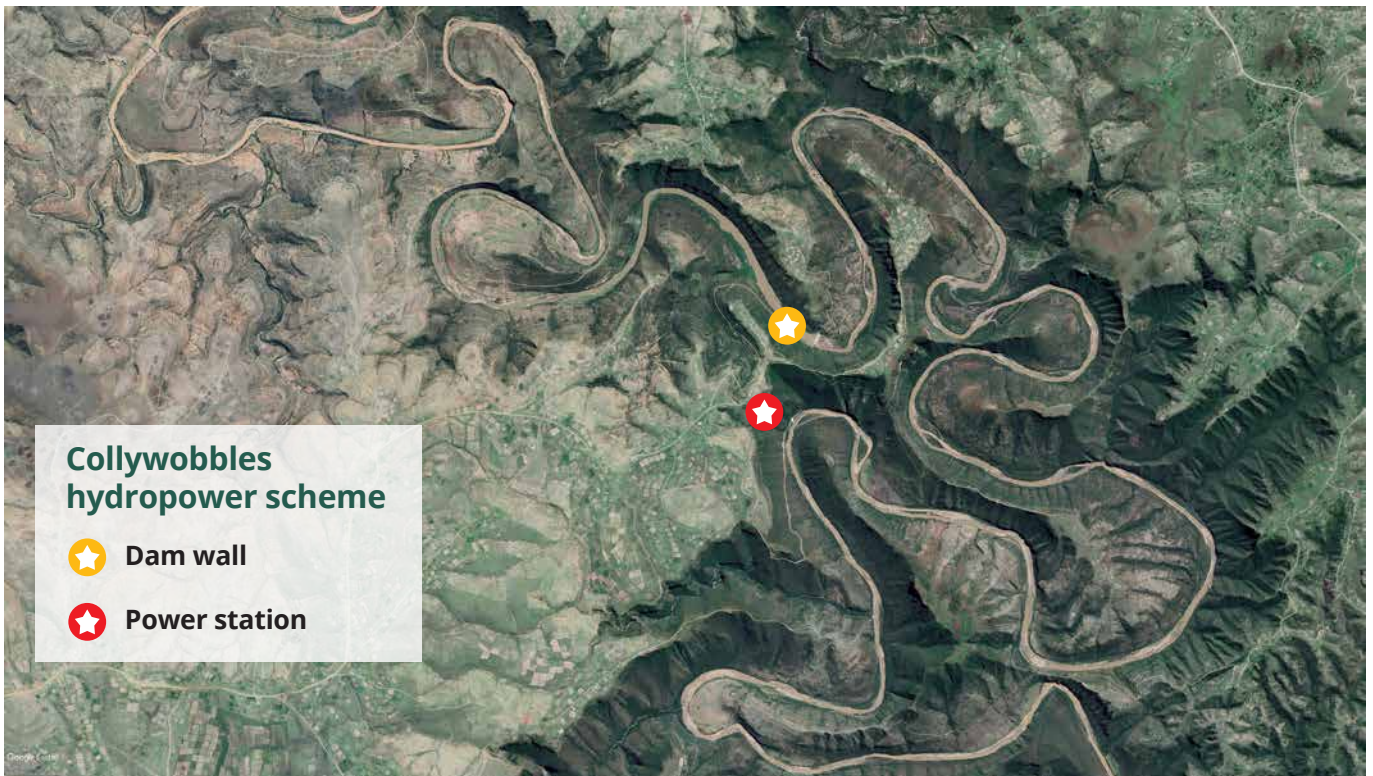
Furthermore, Eskom purchases electricity from three hydropower facilities constructed under the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP). These are the 4.4 MW Stortemelk Power Plant near Clarens in the Free State, the 10 MW Neusberg Hydro Electrical Project at Kakamas in the Northern Cape and the 4.7 MW Kruisvallei Hydro, also near Clarens.

There are numerous other small facilities operated by municipalities, farms and businesses for their own use, and potential for many more. South Africa also imports electricity generated by the Cahora Bassa hydropower scheme on the Zambezi River in Mozambique.



Tennessee Valley Authority, CC BY 2.5

Conventional storage-regulated hydropower scheme.



The Collywobbles hydropower scheme on the Mbashe River has a penstock through the canyon ridge, diverting water from the dam down to the power station 1.4 km away. Below, clockwise from left: dam wall and intake, power station, control room, generating units, substation.

