



Drakensberg Pumped Storage Scheme

In the early 1970's demands made on the Vaal River system were growing relentlessly and problems of future water supply for industries, commercial and domestic use in the Gauteng area were becoming increasingly serious. The solution was obvious – transfer water from the Tugela River catchment to the Vaal River catchment. As water transfer over the Drakensberg would require the construction of reservoirs, channels and pumps, it opened the way for the building of a hydroelectric power station, which could further utilise the potential of water resources being made available. The then Department of Water Affairs and Forestry (DWAF) and Eskom started work on this dual-purpose scheme in 1974. In 1982 the project was completed, operating as a pumped storage scheme and as a pumping station for water transfer over the Drakensberg Mountains from the Tugela River into the Vaal River.

Most of the power station was constructed underground. The surface buildings and access roads were built in such a way that they are hardly visible; as a result, the beautiful natural surroundings appear virtually untouched.

The upper reservoir for the scheme, Driekloof Dam, is part of Sterkfontein Dam. It has a capacity of 35,6 million cubic metres. The 500m long dam wall is partly submerged when Sterkfontein is full. During the weekly cycle of the scheme, the water level fluctuates over 22m, when around 27 million cubic metres of water is released to generate electricity or pumped back. The lower reservoir, Kilburn Dam, is in the foothills of the escarpment and has a capacity of 36 million cubic metres. The power station/pumping plant is situated between the two reservoirs, 156 metres below the surface – equal to 52 storeys. The waterways connecting the two reservoirs are 2,9km long.

Drakensberg has four units in its massive Machine Hall, each with a capacity of 250MW – giving a total capacity of 1000MW. The maximum speed at which the turbines rotate is 375r/pm. Electricity is generated at 11kV and then stepped up to 400kV by transformers in the underground Transformer Hall.

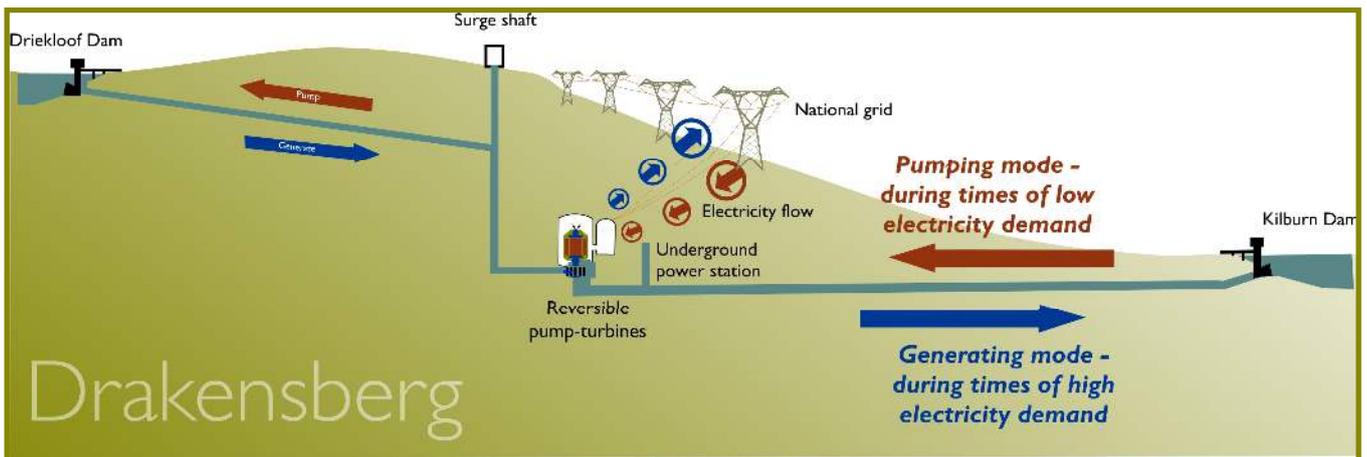
During periods of peak or emergency demand, water is released from the upper Driekloof Dam into the lower Kilburn Dam through the pump/turbines, generating electricity. During off-peak periods, when customer demand for electricity is reduced, the pump/turbines are reversed, they now draw electricity from the national grid and pump the water back into Driekloof Dam at the top of the escarpment.

Advantages and disadvantages of pumped storage schemes

Pumped storage schemes (and hydro-electrical stations) respond very quickly to changes in the demand for electricity. Coal-fired power station requires several hours from cold start before it can start generate power, therefore pumped storage schemes are preferred as 'peaking' stations. They can be brought on-stream within three minutes and play a major role in maintaining the stability of Eskom's national network. They are, however, more expensive to operate than conventional hydro-electric power stations because of the pumping costs.

However, the pumping cost is off-set by the fact that pumping is done during times of low demand on the national network, typically at night or over weekends. In effect, it uses the 'surplus' electricity for pumping as the electricity being generated by the base load stations cannot be stored in large quantities.





Operation of Drakensberg Pumped Storage Scheme

Inter-catchment water transfer

South Africa’s major industrial and mining activities are centered in the Gauteng area, which depends on the Vaal River system for water supply. However, water demand has long outweighed the Vaal River’s capacity of 1 545 million cubic metres per year. The Tugela Vaal Water Transfer Scheme has the capacity to transfer 631 million cubic metres of water per, and storing 2 660 million cubic metres, which can be released into the Vaal system in times of need - an increase of 52%.

The Drakensberg Pumped Storage Scheme plays a dual role of being a power station and a pump station for the Tugela-Vaal Water Transfer Scheme.

Visitors Centre

Visitors Centre staff conducts daily tours of the power station during weekdays. Presentations can also be given off-site. Booking in advance is essential. Identification required and closed shoes must be worn.

Contact: 036-438 2088/9
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For further information about the Drakensberg Pumped Storage Scheme, consult our technical brochures available from the Visitors Centre or on the Eskom website. More information about Eskom related topics is available www.eskom.co.za). Click on ‘About electricity’, then ‘Visitors Centres’.

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