



## Friedenheim Hydro



### Project Summary

**Type:** Hydro

**Size:** 2.5 MW mini-hydropower.

**Ownership:** Friedenheim Hydro is owned by the Friedenheim Irrigation Board (FIB) and operated by MBB Consulting Engineers Inc.

### Background:

The Friedenheim hydro plant is located on the Crocodile River near Nelspruit in Mpumalanga Province of South Africa. It has been in operation since 1988.

The 2.5 MW hydro plant was commissioned in and has been operational since 1988. It was built to provide power for the Friedenheim Irrigation Board (FIB) water pumping requirements during the months September, October and November.

The site was chosen as there was already a canal and penstock on the river contributing to the lowering of the capital costs for the hydro station.

A second project was identified as long ago as 1989 at Krokodilpoort also on the Crocodile River where 70-m fall is encountered over a distance of 3-3.5 km. This delivers an effective head of 62m with a potential generating capacity of up to 5MW. This project may still be developed when the legal and regulatory frameworks are adjusted to create a more attractive environment for independent power plants (IPP).

### Plant Description:

Developed by the Friedenheim Irrigation Board as a 2.5MW run of river hydro powered IPP. The electricity generated is used to drive 4 x 300kW electrically driven water pumps for FIB's own use, the rest of the electricity (93%) is available for sale.

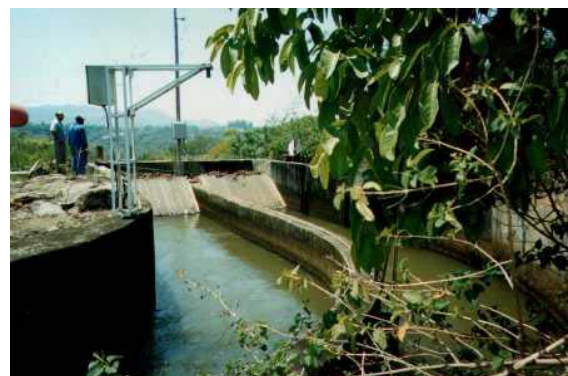
### Financial Aspects:

Income is generated from the sale of excess power generated to the Mbombela Municipality (formerly Nelspruit Local Authority) through a power purchase agreement (PPA) that sets the tariff at 12% below the price at which the local authority buys power from Eskom, its bulk electricity supplier.

### Project Progress:

The project has been operational since 1988. It is recognised as the first IPP in South Africa.

Friedenheim's track record has proven that it is possible for small and renewable energy producers to sell energy into the wholesale market and to compete with Eskom, the national generator.



### Stage in Process:



## Focus Area: Financial

### Background to Project Viability:

Friedenheim Hydro is privately owned, sells the bulk of the generated electricity through a Power Purchase Agreement (PPA) and is a profitable operation.

The business case for the development was based on the benefit of self-generation of electricity for pumping water to FIB's existing irrigation canal during dry periods from the Crocodile River.

Additional revenue is generated from the sale of excess power through a PPA that sets the tariff at 12% below the price at which the local authority buys power from Eskom. Thus the demand for generated surplus electricity was secured through an innovative win-win approach.

### Financial Summary:

- **Capital cost: R 3.25 million (1988 value)**
- **FIB equity contribution: R 1 million**
- **Department of Agriculture loan: R 2.25 million**
- **Loan period 20 years**
- **Annual O & M cost R 250,000 (2004 value) plus 12% of annual power sales**
- **Annual power sales R 1.5 million (2004 value)**

### Investment:

The initial investment of R 1 million made by FIB was paid back after seven years of operation.

### Operations:

The system has been operated and maintained for the past 18 years by MBB Consulting Engineers. During the period certain improvements have been implemented to increase the reliability and reduce the maintenance costs.

In particular the following have been implemented:

- An incentive based operation and maintenance contract based on 12% of the value of income generated through the sale of electricity.
- A preventative maintenance programme.
- Keeping a critical spare parts stock.
- A comprehensive management reporting system to the client (FIB).

### Sponsor details:

The plant is owned by the members of the Friedenheim Irrigation Board (FIB) and operated by MBB Consulting Engineers.



### Contact Details:

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This case study is one of a number in this series.  
Each case study has a specific focus from one of four different perspectives namely: -  
Ownership, Financial, Environmental and Market Potential / Network Access.  
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