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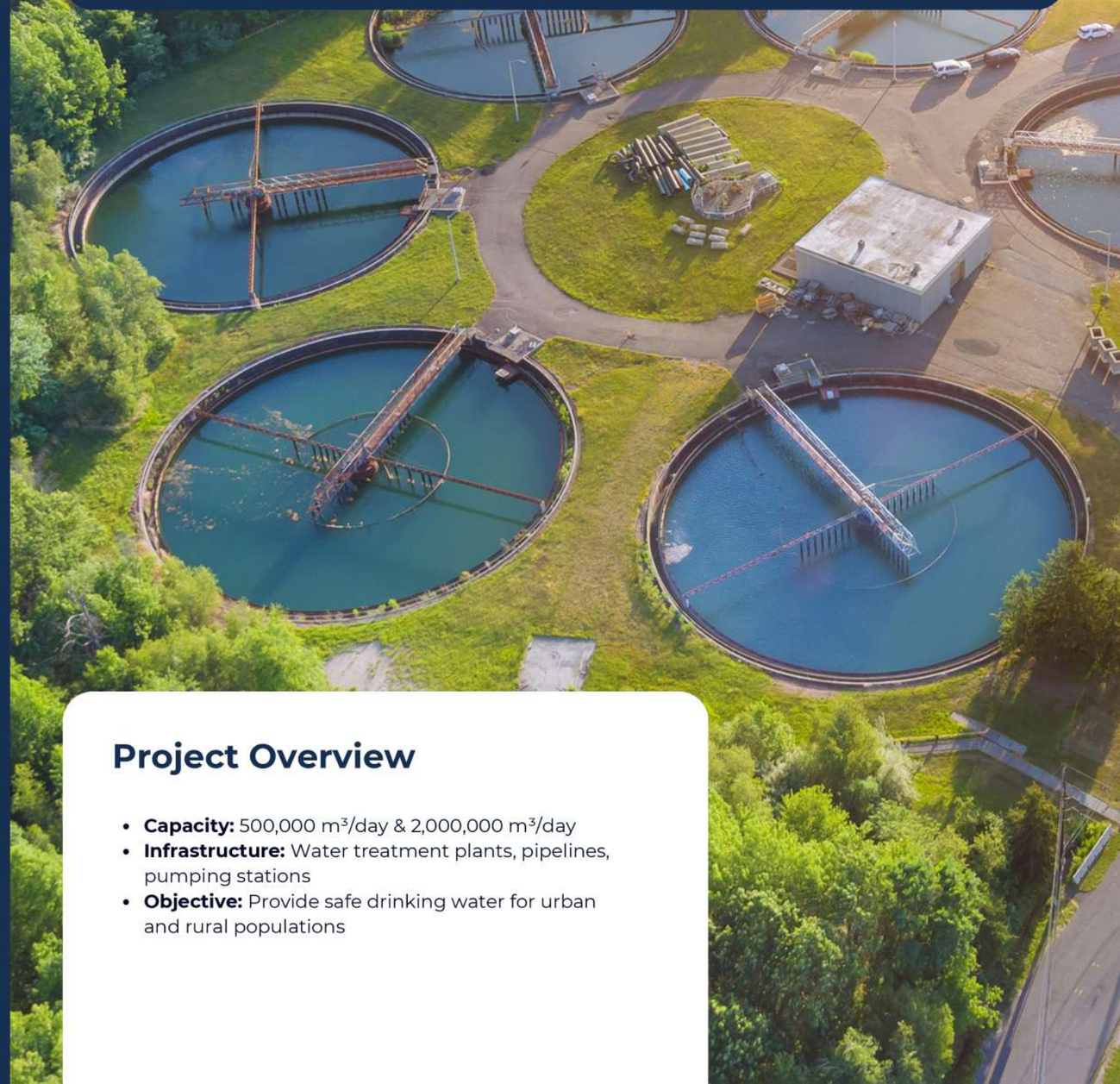
CASE STUDY

Drinking Water Treatment



Project Overview

- **Capacity:** 500,000 m^3/day & 2,000,000 m^3/day
- **Infrastructure:** Water treatment plants, pipelines, pumping stations
- **Objective:** Provide safe drinking water for urban and rural populations

Financial Model: 500,000 m³/day & 2,000,000 m³/day (Investor to Government to Public Resale Model)

Parameter	500,000 m³/day (PGK)	500,000 m³/day (USD)	2,000,000 m³/day (PGK)	2,000,000 m³/day (USD)
Current PNG Residential Water Tariff (2023)	K1.45/m³	$0.39/m³	K1.45/m³	$0.39/m³
Proposed Wholesale Tariffs (Govt. Buys from Investor)				
Year 1-5	K1.10/m³	$0.30/m³	K1.10/m³	$0.30/m³
Year 6-10	K1.20/m³	$0.32/m³	K1.20/m³	$0.32/m³
Year 11-20	K1.30/m³	$0.35/m³	K1.30/m³	$0.35/m³
Proposed Retail Tariffs (Govt. Resells to Public)				
Year 1-5	K1.45/m³	$0.39/m³	K1.45/m³	$0.39/m³
Year 6-10	K1.60/m³	$0.43/m³	K1.60/m³	$0.43/m³
Year 11-20	K1.80/m³	$0.49/m³	K1.80/m³	$0.49/m³
Estimated Wholesale Revenue (Investor to Govt.)				
Year 1-5	PGK 200.75M/year	$54.20M/year	PGK 803M/year	$216.81M/year
Year 6-10	PGK 219M/year	$59.13M/year	PGK 876M/year	$236.52M/year
Year 11-20	PGK 237.25M/year	$64.06M/year	PGK 949M/year	$256.23M/year
Estimated Retail Revenue (Govt. Resells to Public)				
Year 1-5	PGK 264.63M/year	$71.45M/year	PGK 1.058B/year	$285.81M/year
Year 6-10	PGK 292M/year	$78.84M/year	PGK 1.168B/year	$315.36M/year
Year 11-20	PGK 328.5M/year	$88.70M/year	PGK 1.314B/year	$354.78M/year
CAPEX (Capital Expenditure)	PGK 925M - PGK 2.96B	$249.75M - $799.20M	PGK 3.7B - PGK 11.84B	$999M - $3.197B
OPEX (Operational Expenditure per year)	PGK 37M - PGK 148M	$9.99M - $39.96M	PGK 148M - PGK 592M	$39.96M - $159.84M
10-Year ROI (Investor Returns on Wholesale Pricing)	~9.5%	~9.5%	~9.5%	~9.5%
20-Year ROI	~20%	~20%	~20%	~20%
IRR (Internal Rate of Return, 20 years)	8.5% - 11.5%	8.5% - 11.5%	8.5% - 11.5%	8.5% - 11.5%
Breakeven Period	~10 years	~10 years	~10 years	~10 years

Key Takeaways:

- The model scales proportionally from 500,000 m³/day to 2,000,000 m³/day.
- Investor-Govt. Tariff Pricing starts at K1.10/m³, increasing over time.
- Govt.-Public Retail Tariff follows a progressive increase, ensuring long-term sustainability and taking into consideration inflations and operational expenses.
- Wholesale & Retail Revenues scale 4x in the 2,000,000 m³/day model.

This modelling is aligned with PNG's actual water tariff structure and reflects realistic affordability concerns for government resale pricing.

Case Study: Candelabro Water Plant Phase-III Project in Angola

https://www.sinomach.com.cn/en/MediaCenter/ News/202110/t20211014_318863.html

CMEC water plant project draws widespread praise in Angola

2021-10-14 Design drawing of CMEC Candelabro Water Plant Phase-III Project

The phase-III construction of the Candelabro Water Plant, a key public-benefit project of Angola, was recently featured for three days on the TV program "Angola in Progress" produced by TPA, the country's national broadcaster.

The project was undertaken by Sinomach subsidiary China Machinery Engineering Corporation (CMEC).

Reports on the plant detail its background, construction schedule and quality and its environmental and safety monitoring system, as well as the epidemic control measures taken in the work.

When completed the project will be interconnected with the phase I and II water plants, also constructed by CMEC. Water quality monitoring and overall balanced water supply will be achieved through remote collection of water sample data and centralized dispatching.

After interconnection, the plant will have a daily capacity of 210,000 cubic meters, which will benefit nearly two million people in nine regions including the capital Luanda. The "Water City Candelabra" will come into being and solve the problem of people's difficult access to drinking water.

Water Usage and Sewerage Disposal

This Schedule relates to the maximum Water and Sewerage rates for all Water Supply and Sewerage Services supplied by Water PNG. Subject to the above Conditions for Tariff Approval, the maximum prices which may be charged by Water PNG in respect of any accounts issued on or after 1st January 2023 (other than arrears which may only be charged at the maximum prices prevailing when those charges were incurred) are as follows:-

SCHEDULE 1

	Services	Tariff
1.0	**Water Supply**	
1.1	0.1 to 30 Kilolitres (Band 1)	K1.45 per kilolitre
1.2	Above 30 Kilolitres	Water PNG can charge any price, along any categories so long as the average prices charged does not exceed the maximum average price of K4.16 per kilolitre
2.0	**Sewerage**	
2.1	0.1 to 30 Kilolitres (Band 1)	K1.00 per kilolitre
2. 2	Above 30 Kilolitres	Water PNG can charge any price, along any categories so long as average prices charged does not exceed the maximum average price of K3.12 per kilolitre

Miscellaneous Services & Charges

This relates to the Miscellaneous services which include, reconnections, standby, head works and trade wastes relating to water and sewerage services. Water PNG can charge any price on its miscellaneous services so long as the average prices do not exceed the maximum average price of K4.16 for water-related service and K3.12 for sewerage-related services.

Source:Gazette-No-G8-of-2023-Water-Sewerage-Services-Prices-Order-2023-WATER-PNG-LIMITED https://iccc.gov.pg/wp-content/uploads/2023/08/Gazette-No-G8-of-2023-Water-Sewerage-Services-Prices-Order-2023-WATER-PNG-LIMITED.pdf?
1 kL=1 m3=1,000 liters (L)