Ranhill SAJ Sdn Bhd

Sustainable Water Management through Data: Ranhill SAJ's Implementation of LCOS

Ranhill SAJ

Ranhill Corporate Video

Ranhill SAJ - Company Overview

- **Ranhill SAJ Sdn Bhd** is a subsidiary of Ranhill Utilities Berhad, operating primarily in the water supply and management sector. Founded in 1999, it is headquartered in Johor Bahru, Johor, Malaysia.

- Ranhill SAJ is the sole water operator for Johor state, responsible for raw water abstraction, water treatment, distribution, and the sale of treated water. This comprehensive operation includes maintenance and management of the entire water supply network.

- Ranhill SAJ operates 46 water treatment plants across Johor with a combined treatment capacity of 2,171 million litres daily (MLD). These plants serve approximately 4 million residents as well as numerous commercial and institutional clients.

Ranhill SAJ - Company Overview

- The infrastructure managed by Ranhill SAJ includes 716 reservoirs and an extensive pipeline network spanning 24,002 kilometers. The company also oversees 80 active pump houses to ensure efficient water distribution throughout the state.

- Ranhill SAJ is committed to reducing non-revenue water (NRW) levels. In collaboration with Ranhill Water Services Sdn Bhd, we have successfully reduced the NRW percentage to **25.0% as of FY2023**. Our goal is to further decrease NRW levels to 20.9% by 2025.

Net Zero Carbon & Sustainability Progam in Johor Water Treatment Plant

Ranhill SAJ

RanhillSaj Water Treatment and Distribution Business

Well established as an integrated water supply company, Ranhill SAJ manages & operates potable water supply in the state of Johor.

WATER TREATMENT PLANT
46 plants

CONSUMER
1.2 MILLION accounts

116 active pump houses

714 reservoirs

24,002 km of pipelines

FILTER | CLEAN WATER TANK | PUMPING STATION

JOHOR

No.1 in Malaysia

The lowest NRW Measurement in Malaysia at only 0.017 MLD per KM

44
HACCP (Hazard, Analysis, Critical, Control & Point) certified water treatment plant

20MLD SULTAN ISKANDAR WTP EXTENSION PROJECT

INTRODUCTION

Existing plant has an operating capacity of 350MLD. This plant is built to supply additional total 20,000 m3/day of clear water to the existing piping distribution network.

OPERATING EXPENSES

The operation and maintenance cost for this plant is RM 0.30/m³.

ENERGY SAVINGS

By installation of the Solar PV system, estimation minimum total 60,714kWh of electricity able to generate from the sun annually which is equivalent to RM25,822 annually savings from the electricity bill.

NET ZERO & SUSTAINABILITY MEASURE

Total 54 kW peak Solar Photovoltaic (PV) System with total 134 nos. of each 405W PV module was installed on the rooftop of treatment building.

The solar inverter converts DC power generated from the Sun into the AC power and feed into the Main Switch Board (MSB). The incoming power to MSB will be compensated by the power generated from the solar system and thus resulting in extra energy saving.

POINT SOURCE POLLUTION REMOVAL SYSTEM (PRS) FOR SIMPANG RENGGAM WTP, JOHOR

INTRODUCTION

Surge in Ammoniacal Nitrogen (AN) level causing frequently shut down of existing Simpang Renggam WTP. PRS system is built to reduce AN concentration from 500ppm to less than 10ppm to ensure continuous operation of existing plant without interruption.

OPERATING EXPENSES

The operation and maintenance cost for this plant is RM 3.35/m³.

NET ZERO & SUSTAINABILITY MEASURE

High concentration of Ammonia (NH_3) is a common cause of aquatic life in water. River water with high concentration level of Ammonia is unsafe to drink. As a sustainability measure, the PRS treatment system is installed to solve this issue.

The contaminated air from air stripper will be treated by a gas scrubber before the clean air being channel back to the air stripper to repeat the same stripping process again. The overall process is a close-loop system and therefore no hazardous air is emitting to the atmosphere and energy is conserved within the system.

30MLD SEMBRONG BARAT DISSOLVED AIR FLOTATION (DAF) PLANT

INTRODUCTION

Sembrong Barat Water Treatment Plant (WTP) was built with design capacity of 80MLD. The raw water source for the WTP is extracted from the Sembrong Dam. The catchment area is approximately 130km² and predominant land use is agriculture.

OPERATING EXPENSES

The operation and maintenance cost for this plant is RM 0.33/m³.

NET ZERO & SUSTAINABILITY MEASURE

High Concentration of algae in the incoming raw water source from Sembrong Dam. The algae blooming issue in the dam has interrupted the subsequent treatment process. The performance of existing sludge blanket clarifiers has been affected by the algae.

As a sustainability measure, this 30MLD Reroplus Dissolved Air Floatation (DAF) was commissioned to increase the capacity of overall plant production to meet the water demand as well as mitigate the algae issue. The produced clean water meets the Ministry of Health (MOH) quality to ensure it is safe for drinking and benefits to the end user.

UPGRADING OF 130KVA MINI HYDRO AT GUNUNG LEDANG WTP

INTRODUCTION

Gunung Ledang Water Treatment Plant (WTP) was built with design capacity of 10MLD. The raw water source for the WTP is extracted from the Gunung Ledang Dam.

ENERGY SAVINGS

The total savings for this plant is RM 0.29/kwh x 70kW X 24 hours x 30 days X 12 month = RM 175,392.00 / year

The total usage of energy for this plant is 604,800kW per year

NET ZERO & SUSTAINABILITY MEASURE

Gunung Ledang Water Treatment Plant (WTP) was built at lower level from the dam. The incoming raw water flow to the plant was by means of gravity. Hence there is sufficient hydraulic difference for hydro power to be generated.

Base on the rule of thumb for the available power factor, the potential power generation based on the differential level between the dam and WTP is 130kVA (100kW). A mini hydro was installed to make use of the available hydropower for the plant usage hence eliminate the need of the power usage from the authority power supply thus leading to net zero sustainability.

Significant Timeline

Time	Description
2014	Second runner-up for MYCarbon Awards 2014 organized by the Ministry of Natural Resources & Environment.
2015	First runner-up for the MYCarbon Awards 2015 organized by the Ministry of Natural Resources & Environment.
	Certification of ISO 50001 : 2011 (updated to ISO 50001:2018) Energy Management System (EnMS)
2017	Formation of Carbon Footprint Team
2021	Operational of Solar Panel PV (Photovoltaic) at Sultan Iskandar WTP
	Operational of Mini Hydro at Ledang WTP
2022	Commenced collaboration with Malaysian Green Technology and Climate Change Corporation (“MGTC”) to develop a comprehensive GHG baseline and roadmap for the Group towards the realisation of Ranhill’s Net Zero Carbon 2050 aspiration.

Significant Timeline

Time	Description
2023	Implementation of Low Carbon Operating System (LCOS) in Calculating GHG Emissions
	National Energy Awards (NEA) 2023 – Winner in the Renewable Energy Category for Micro Hydro Application at the Gunung Ledang Water Treatment Plant in Tangkak, Johor
	Asean Energy Awards (AEA) 2023 – First Runner Up Renewable Energy Project, Off-grid Category - Micro Hydro Application at the Gunung Ledang Water Treatment Plant in Tangkak, Johor
	Malaysian Book of Record - First water operator in Malaysia to receive 'Hazard Analysis Critical Control Point' (HACCP) certification from the Standards and Industrial Research Institute of Malaysia (SIRIM) for 44 Water Treatment Plants (WTP) in this state.

Ranhill SAJ GHG Emission

Scope	Emission Sources	Data Validation
Scope 1	Stationary Combustion	Production & Facility Mangement
	Mobile Combustion	Transport
	Fugitive Emissions (Refrigerator)	Facility Mangement
	Fugitive Emissions (Air-Conditioner)	Facility Mangement
	Fugitive Emissions (Mobile Air-Conditioner)	Transport
	Fugitive Emissions (Fire Suppression System & Fire Extinguisher)	Mechanical & Electrical
Scope 2	Purchased Electricity	Mechanical & Electrical
Scope 3	Cat. 1 Purchased Goods & Services	Contract & Procurement
	Cat. 2 Capital Goods	Contract & Procurement
	Cat. 3 Fuel & Energy-Related Activity	-
	Cat. 4 Upstream Transportation & Distribution	-
	Cat. 5 Waste Generated in Operation	Production & Water Quality
	Cat. 6 Business Travel	HR
	Cat. 7 Employee Commuting	HR

Challenges in GHG Emission Calculations

Initial Challenges in GHG Emission Calculations

- Absence of Standardized Methods
- Inconsistent Data Collection - The absence of a unified approach resulted in inconsistent data collection processes across different departments.
- Manual Processes - Manual data entry and calculations were prone to human error, leading to inaccuracies and data gaps.

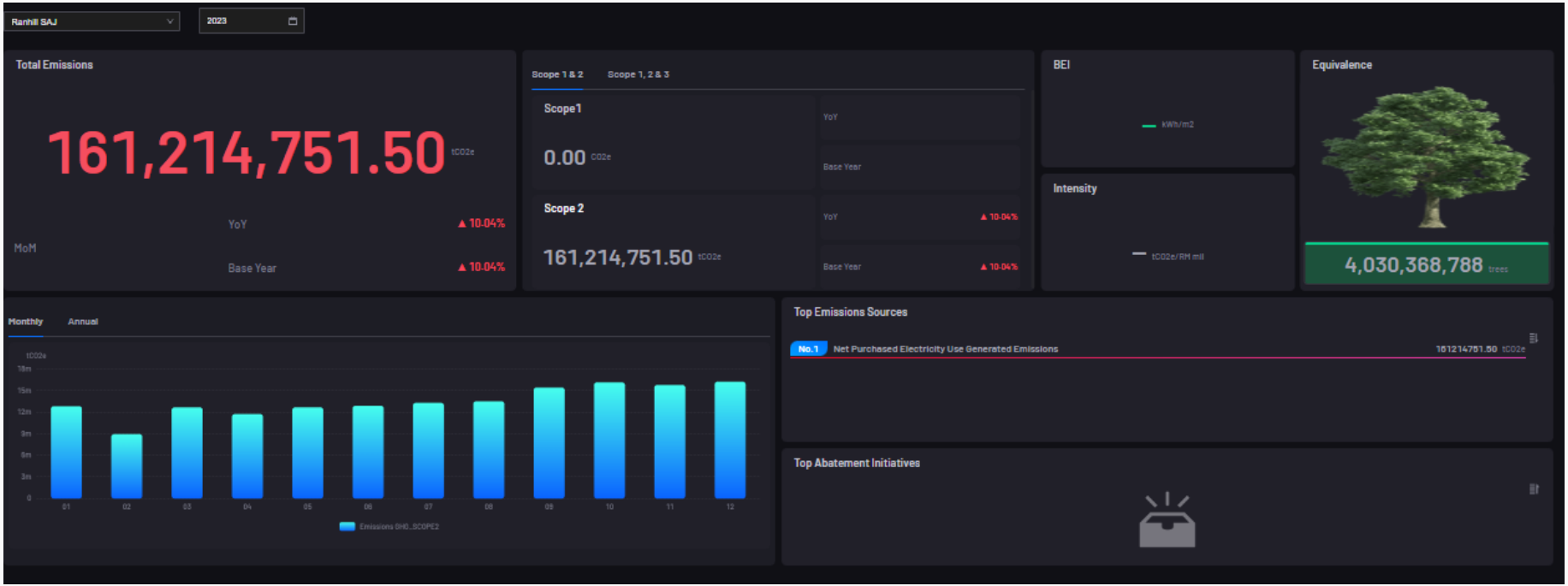
Collaboration with MGTC and Implementation of LCOS

Ranhill Collaboration with MGTC

- Ranhill SAJ through Ranhill Utilities Berhad formed a strategic partnership with the Malaysian Green Technology Corporation (MGTC) to enhance the accuracy of GHG emission calculations.

- MGTC provided specialized guidance and support in developing standardized and accurate methods for GHG data collection and analysis. Through this collaboration, Ranhill SAJ established comprehensive guidelines and protocols, ensuring consistency and reliability in GHG emissions reporting.

Ranhill Net Zero Roadmap



Ranhill SAJ's LCOS dashboard interface supports SPAN initiatives for the implementation of LCOS.

Collaboration with MGTC and Implementation of LCOS

Implementation of LCOS

- Ranhill SAJ implemented the Low Carbon Operating System (LCOS) to streamline GHG emissions calculations and integrate various data sources

- The adoption of LCOS significantly improved the accuracy and reliability of GHG emissions data, enabling better strategic decision-making. Accurate data from LCOS empowered Ranhill SAJ to make informed decisions, leading to operational efficiencies and improved sustainability outcomes.

Q & A

THANK YOU

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SAJ