# Emulsion Flow Technologies Ltd.

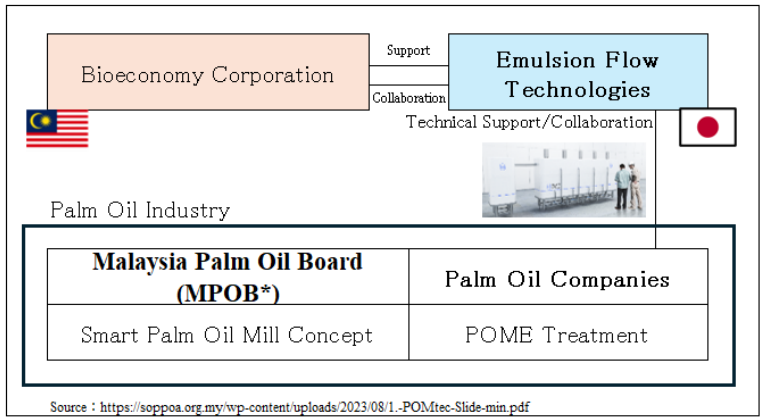
## Preliminary Study and Demonstration Project on Wastewater Treatment and DX-Driven Smart Factory Implementation in Malaysian Palm Plantations

### Objective of the project

Palm Oil Mill Effluent (POME), a wastewater generated in large quantities during palm oil production process in Malaysia, contributes significantly to environmental burden. This project aims to demonstrate the reduction of environmental impact and valuable resource recovery by applying "Emulsion Flow" (EF) system" developed by Emulsion Flow Technologies' (EFT). It also explores and clarify the potential of EF to contribute to Malaysia's "Smart Palm Oil Mill" initiative. By introducing this technology, the project will assess DX-related benefits such as labor savings and efficiency improvement, supporting the transition to a more sustainable industrial infrastructure.

### Cooperation with local companies/governments

- Local Partners: Bioeconomy Corporation, palm plantation companies
- Details of Partnership/Cooperation: Collaborating to develop and implement solutions for POME treatment.




### Targeted economic/social issues

Malaysia, the world's second-largest producer of palm oil, generates over 20 million tons of Palm Oil Mill Effluent (POME) annually. This high-strength industrial wastewater is considered a serious environmental issue. If not properly managed, POME can cause water pollution, greenhouse gas emissions, and odor problems. Most palm oil mills currently rely on anaerobic lagoon systems, which face multiple limitations - large land requirements, odor and sludge management costs, overflow risks during heavy rain, and difficulties in meeting international environmental standards without additional treatment.

As Malaysia strengthens its effluent regulations under environmental protection laws, there is a growing demand for space-saving, energy-efficient, and high-performance treatment technologies. The government is promoting "smart agriculture" and "smart factory" initiatives that encourage digitalization and labor-saving solutions. However, scalable and practical technologies remain scarce at the ground level. Many small and mid-sized palm mills face challenges in implementing such innovations due to costs and technical capacities. Key features like process optimization, remote monitoring, and reduced human dependency are aligned with national policy goals, yet real-world adoption remains limited due to costs and operational constraints.

# Emulsion Flow Technologies Ltd.

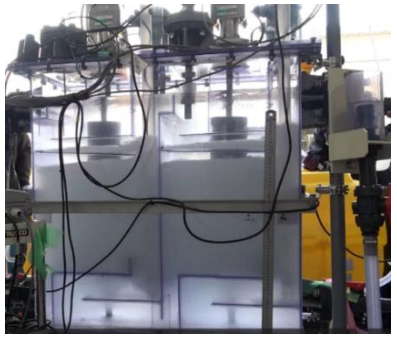
## Preliminary Study and Demonstration Project on Wastewater Treatment and DX-Driven Smart Factory Implementation in Malaysian Palm Plantations

### Demonstration period

January 2024 – May 2025

### Details of demonstration

This project evaluated the applicability of Emulsion Flow Technologies' (EFT) system for treating Palm Oil Mill Effluent (POME) from Malaysian mills. Tests at EFT's research facility assessed treatment performance, contaminant removal, operational stability, and real-time monitoring function. The system's space efficiency, compatibility with existing infrastructure, and potential for continuous operation were also examined, showing alignment with Malaysia's Smart Palm Oil Mill initiative. An external evaluation found that, compared to the open pond systems, the EF system enables more compact and efficient operation with better water quality, faster treatment, and potential reductions in greenhouse gas emissions. These results indicate that the EF system could serve as a promising alternative technology. The project has laid the foundation for future collaboration with local partners and pilot-scale deployment, contributing to environmental sustainability and industrial modernization in Malaysia.



Sensor-equipped 100-liter two-stage Emulsion Flow system

### Project outcome/ future plans

The project demonstrated the Emulsion Flow (EF) system's capability to selectively recover valuable components from POME, confirming the potential for creating new added value from resource recovery of wastewater. The EF system operates with a compact footprint and low energy consumption, and its design is compatible with smart system integration, supporting automation and remote monitoring in smart palm oil mills. Comparative assessments conducted by the Bioeconomy Corporation, the project's local partner, highlighted the EF system's advantages in reducing waste while maintaining economic feasibility, reinforcing expectations for its broader implementation.

In addition to successful extraction of useful substances, the pilot trials revealed the presence of organic compounds that remain difficult to extract under current conditions, providing important insights for future development.

Based on these results, the project has laid the foundation for deeper collaboration with palm oil producers and both public and private stakeholders in Malaysia. Efforts will now focus on pilot-scale deployment in real industrial settings and exploring applications for other byproducts or wastewater sources, aligning with national smart agriculture and bioeconomy policies to advance practical, sustainable technology adoption.

Conceptual installation layout of the Emulsion Flow (EF) system