

Main Organiser



Outreach Partners



Nanyang Environment and Water Research Institute



Problem Statement Call

Next Generation Sustainable Water Technologies (Phase 1)

Launch Date: 24 January 2024

Problem Statement 5 : Biofuel Separation from Wastewater

Statement Owner : Private

Background of Current Process & Challenge Statement

Biofuels like bioethanol and biomethanol are derived from organic materials like plant materials and animal waste. Due to the global focus on decarbonization and the emphasis to shift away from fossil fuels, sustainable biofuels are now an attractive alternative¹. An International Energy Agency report forecasted that demand for biofuels is set to grow globally by 28% for the period of 2021 to 2026². However, more innovations are needed to lower the cost of biofuel production and to enable more biofuel facilities to operate effectively to meet the growing demand³.

An approach is to optimize the wastewater treatment processes so as to reduce capital expenditures⁴. Wastewater is generated in the treatment process when contaminants like residual catalysts, etc are removed from biofuel. It is noted that wastewater treatment technologies can be better integrated with biofuel production process design. Efforts to recycle biofuel and water via separation and recovery from the wastewater stream can reduce capital and operating costs of bioconversion facilities.

Desired Outcomes

It will be important to offer solutions / products that can

- Recover biofuel from wastewater.
- Facilitate recovery of water from wastewater.
- Facilitate sustainability via reduction of energy consumed in the processing.

Requirements

- The system should be cost effective.
- Solution should be at Technology Readiness Level of 6 or higher, that is, the solution has already been tested and verified in a relevant operational environment.
- Solution proposal to include
 - Process design, technologies and technology providers
 - Detailed scientific principles of the proposed technologies, including detailed comparison with current global state-of-the-art and a brief technology review
 - Detailed consideration of how the unit processes would work together and the impact on individual unit processes when one (or more) of them is (are) optimised for energy
 - Full technical details on the methodology and technological development of the proposal, including P&ID, layout drawings of the equipment retrofit at D-IVP, equipment specification, etc.
 - Detailed techno-economic analysis
 - Project team member's expertise, previous related work and experience.
 - Timeline for the project, showing intermediate milestones to be achieved.

¹ <https://biofuels-news.com/news/future-trends-in-biofuel/>

² <https://www.iea.org/reports/renewables-2021/biofuels?mode=transport®ion=World&publication=2021&flow=Consumption&product=Ethanol>

³ <https://biofuels-news.com/news/future-trends-in-biofuel/>

⁴ <https://biotechnologyforbiofuels.biomedcentral.com/articles/10.1186/s13068-020-1657-7>

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- Expected research outcomes, and proposed KPIs for the project.
- General business plan: how the Intellectual Property (IP) created will be owned and commercialised.
- Detailed budget required for the project (broken down into individual categories of manpower, equipment, consumables, travel, consultancy services, others).

Pilot scope

- Challenge statement owner is ready to allocate manpower resources, equipment and space for selected provider(s) to pilot and demonstrate technological and business viability.
- Successfully selected technology provider(s) are to install and test systems onsite within an oil processing facility.

Timeline

	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
R2Wi first Water Challenge Call (Closed Door)	6 13 20 27	3 10 17 24 31	7 14 21 28	4 11 18 25	3 10 17 24 31	7 14 21 28	5 12 19 26	2 9 16 23 30
Preparation for launch of call - Confirmation of statements by users - Sourcing of sponsors - Partner listing - Technology sourcing - emailing of contacts	PREPARATION							
Launch - Online + OnPremise			LAUNCH / SUBMISSION					
Submission - 2.5 months for receipt of proposals			LAUNCH / SUBMISSION					
Selection Committee - Recruit committee members - Announcement of award to be in SIWW			LAUNCH / SUBMISSION					
Selection of technology providers - Joint selection sessions - Negotiation between PS owners and Tech providers						SELECTION		
Award - press release send to SIWW social media - press release send w R2Wi Social media								AWARD