

Engineering Students Propose Green Innovation for Optimal Oil Production


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The UGM Challenger team consisting of Sasa Aulia (Engineering Physics), Enyca Aidina (Geological Engineering), and Felix Arion Sianipar (Civil Engineering) won first place in the paper and poster competition of the 2021 DERRICK. The annual competition was held by students of PEM Akamigas Cepu starting 20 August to 24 September.

Driven by the gap between Indonesia's oil consumption (1.06 million BOPD in 2020) and its production (705,000 BOPD), the Challenger put forth an environmentally sound unconventional resources technology to help solve the problem. Naming the technology as GENNEO, short for Green Nanofluid-NitroFrac and Electro-Osmo Treatment, the Challenger strives for an adaptive green technology to maximize the country's oil production.

Sasa said the difference between the figures would continue to increase, with the Special Task Force for Upstream Oil and Gas Business Activities (SKK Migas) believing Indonesia's oil consumption to rise by 29% in 2030 to 77.5 MTOE. Unconventional resources can be a solution to narrow this gap as the country has around 453 Tcf of CBM and 574 Tcf of shale gas reserves.



However, unconventional hydrocarbon production generates a lot of wastewater from the well drilling and completion stage and the well production stage. This condition, if left unaddressed, may lead to severe water scarcity in the future.

“Almost 10% of Indonesia’s population is predicted to experience a clean water crisis in 2045. Therefore, we offer GENNEO to help overcome these issues,” said Sasa, Saturday (2/10).

GENNEO comes with nano silica-alumina drilling fluid as a more environmentally safe option to avoid clay swelling in the shale formation. The alternative fracturing, namely LN2 + ULWP, results in fractures with high conductivity. It is proven that LN2 fracturing can increase oil production by 289.8%, and ULWP increases cumulative production up to 63% in horizontal oil wells.

“In addition, GENNEO can produce clean water through the utilization of wastewater after the exploitation process in the field. Hopefully, apart from resolving the government’s problems regarding the development of oil and gas technology from nonconventional sources, GENNEO can still pay attention to aspects of the energy transition,” said Sasa.

The team hopes GENNEO can encourage the government and the oil and gas industry to develop green technology. It also serves as a means of realizing the 2030 SDGs, particularly point 6 (Clean Water and Sanitation), point 7 (Clean Energy), point 9 (Industry and Innovation), and point 12 (Responsible Consumption and Production), which will improve the sustainability of life and the economy in Indonesia.

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