

nanO₂[®] Third-Party Emissions Validation



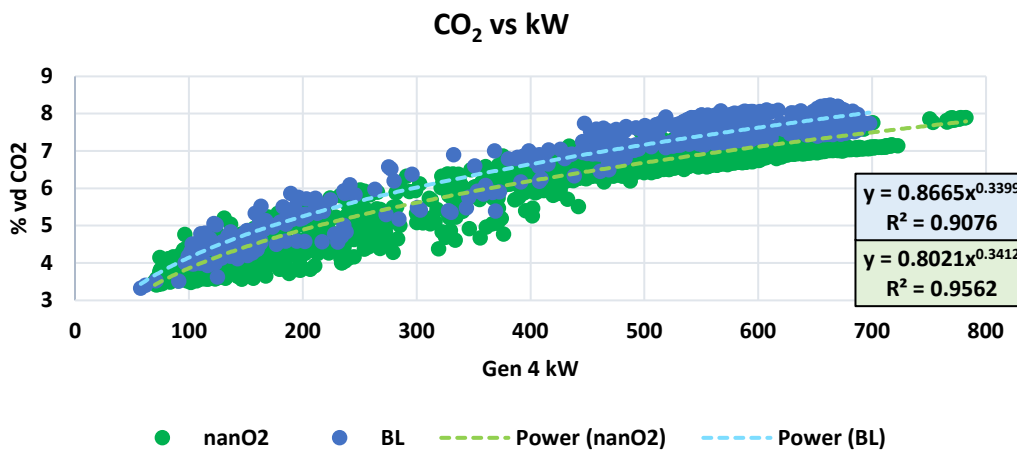
Objective

Reduce greenhouse gas (GHGs) emissions from a diesel power generation system used to power drilling operations in South Texas and validate using third-party real-time emissions monitoring equipment.

Solution and Testing Procedure

Deploy nanO₂ fuel enhancer in a drilling rig's diesel fuel supply and monitor the CO₂ emissions from Generator #4 before and during nanO₂ use. Testing was performed during similar lateral drilling operations and more than 24 hours of high-resolution test data was collected for both stages.

Results



Over both testing periods, the graph above plots electrical kilowatts (ekW) versus CO₂% vapor density (vd). The nanO₂ trend line is lower in the CO₂ throughout the whole load range recorded during the test. This verifies that the rig produces a lower percentage of CO₂ for every given ekW power consumption, implying an overall reduction in CO₂ emissions for any given level of work performed.

Conclusion

The nanO₂ fuel enhancer was successful in lowering the total GHGs from drilling operations. Furthermore, given the proportionate relationship between CO₂ emission and fuel consumption, an equal reduction in fuel consumption can be assumed. The resulting reduction in fuel usage can give a monetary gain, lowering operational costs while meeting emissions targets.

Value Proposition - Manual Dosing

Diesel Cost Per Gallon	\$	3.00
Est Fuel Savings		6.72%
Est Average Gallons Saved per day - Drilling		148
Est Gallons Saved Per Tote		14,840
Estimated ROI		98%

Case Study Details

Location: South Texas

Test Dates:

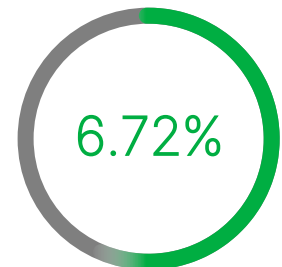
- Baseline : June 7th, 2022
- nanO₂ : January 27th, 2023

Test KPI: CO₂ % vd

Rig Spec: Land Rig

Power Generation: (4) CAT 3512

Results Overview



Reduction in CO₂ Emissions

kW	BL % vd CO ₂	nanO ₂ % vd CO ₂	% Reduction in CO ₂
150	4.76	4.43	6.83%
200	5.25	4.89	6.79%
250	5.66	5.28	6.77%
300	6.02	5.62	6.74%
350	6.35	5.92	6.73%
400	6.64	6.20	6.71%
450	6.91	6.45	6.69%
500	7.16	6.69	6.68%
550	7.40	6.91	6.67%
600	7.62	7.11	6.66%
650	7.83	7.31	6.65%
Avg	6.51	6.07	6.72%

Sources: Emissions Testing Provided by 3rd party, Alliance Technical Group, & analysis performed by Canrig Drilling Technology

