Environmentally Friendly Drilling

Executive Summary

Proposed Joint Industry Project

Apply Data Science for Rapid Modeling of Dual Fuel Diesel Engine Technology

The Houston Advanced Research Center (HARC) Environmentally Friendly Drilling Systems Program (EFD) seeks industry support for a proposed Joint Industry Project (JIP) to develop a predictive model using Data Science. ***The model will support planning and optimization of operations by addressing uncertainties of fuel consumption, engine performance, emissions, and environmental factors.*** An important objective of the proposed Project is to optimize substitution of natural gas fuel for diesel fuel to ***realize value by increasing diesel fuel savings***.

HARC EFD is seeking Sponsorship from operating companies, drilling contractors, service providers, and other industry stakeholders to support this Project with guidance, technical input, and funding. The project will take 6-8 months to complete at a cost of $185,000 to be divided among up to 12 Sponsors – the more Sponsors participating, the lower the cost to each. ***If 12 Sponsors join the cost to each would be $185,000 /12 = $15,417.*** With significant potential benefit in diesel fuel cost savings Sponsors could realize a rapid Return on Investment (ROI), as described in the full Proposal sections on "Cost" and "Cost per Participant" (page 10) in which "Table 3 Sponsor ROI & Payback" can be found.

Table 3. Sponsor ROI & Payback in Days *

Based on the Example in **Figure 2**

A rig that consumes 1,500 gallons of diesel fuel per day could save **$177,609** annually by increasing natural gas substitution from 50% to 60% of the diesel fuel typically used, for daily savings of **$488.**

Return on Investment (ROI)

Annual Fuel Savings $177,609/Sponsorship Fee

Payback in Operating Days

Daily Savings of $488/Sponsorship Fee

Number Sponsors	Sponsorship Fee	ROI	Payback Days
1	$185,000	96%	380
2	$ 92,500	192%	190
3	$ 61,667	288%	127
4	$ 46,250	384%	95
5	$ 37,000	480%	76
6	$ 30,833	576%	63
7	$ 26,429	672%	54
8	$ 23,125	768%	48
9	$ 20,556	864%	42
10	$ 18,500	960%	38
11	$ 16,818	1056%	35
12	$ 15,417	1152%	32

***NOTE: The ROI and Payback Days calculated here consider only diesel fuel cost savings. This does not include the cost of natural gas fuel, which can vary considerably based upon supply availability, infrastructure, royalties, and other factors. Furthermore, these calculations do not account for the capital cost for dual fuel equipment. When these factors are considered, actual ROI would be reduced, and the number of Payback Days would increase.**

Contact

Carolyn LaFleur, P.E.

Research Scientist, Energy & Sustainability

Houston Advanced Research Center

8801 Gosling Road

The Woodlands, Texas 77381

clafleur@harcresearch.org

office 281.364.6047

mobile & text 281.703.8170

HARC

an independent research hub
helping people thrive
and nature flourish

www.harcresearch.org