

Case study: Pressure pumping, Brazil

# Blue Marlin vessel upgrades dynamic positioning system to run in variable frequency mode, saving fuel and lowering Scope 1 emissions

For its well-stimulation work offshore Brazil, Baker Hughes deploys integrated simulation vessels outfitted with dynamic positioning (DP) systems. These computer-controlled systems help maintain the vessel's position and heading without mooring lines and/or anchors. They typically burn diesel fuel at high rates to keep the vessel's props operating at a constant frequency. Vessels might be in DP mode for more than 70 hours per job.

The offshore operator required a control solution that could optimize energy performance during DP operations. Baker Hughes proposed running the DP system in variable frequency mode (VFM), which would help reduce fuel consumption and Scope 1 carbon emissions.

The operator agreed to trial the VFM system on the *MV Blue Marlin™* stimulation vessel, and collaborated with Baker Hughes and the vessel owner on developing the specifics of the solution.

This installation, the first of its kind for the *MV Blue Marlin*, required modifying the vessel with special hardware, software, and ancillary components to make VFM possible.

After installation, the vessel spent 834 hours in DP mode, burning 199,093 liters of diesel for a consumption rate of 239 liters/hour.

This represented a significant fuel savings compared to the vessel's benchmark fuel usage. Prior to VFM installation, the vessel consumed 348,544 liters of diesel when operating for 903 hours in DP mode—a consumption rate of 386 liter/hour.

Assuming a representative fuel cost of \$4.25 USD/gallon, the VFM saved the operator \$137,677 USD in fuel costs, a 38% reduction in fuel consumption and carbon emissions compared to the benchmark.



Blue Marlin vessel

## Challenges

- Optimize dynamic positioning system on stimulation vessels in deepwater
- Save fuel costs and reduce carbon emissions

## Results

- Successfully installed first variable frequency mode on DP simulation vessel in Brazil
- Maintained flawless operation of the vessel's DP system
- Reduced fuel consumption on the vessel by 38% and also reduced CO<sub>2</sub> emissions accordingly
- Saved \$137,677 USD in fuel costs
- Helped achieve significant progress toward the operator's carbon reduction goals.

The operator was satisfied with the greater fuel efficiency achieved by running with the VFM, and the progress made toward reaching its carbon reduction goals offshore.

Baker Hughes plans to upgrade two stimulation vessels operating in the Gulf of Mexico with the VFM system when they return for scheduled dry dock. DP vessels operating in other deepwater fields will be upgraded to VFM in the future.

Table 1		
	Before VFM	After VFM
Hours in DP mode	834	
Consumption	386 l/hr	239 l/hr
Liters of fuel consumed	321,924	199,326
Cost, USD	\$361,520.65	\$223,843.10
Cost savings after VFM	\$137,677.55 USD	
	38%	

Running with VFM activated, saved 147 liters of fuel per hour, and reduced the operation's carbon emissions by 38%