



# Environmental Initiatives

**September 28, 2021**

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# Current ProFrac Initiatives

- Installing Engine Standby Controllers on pumping units at a pace of 1 – 4 per week
- Currently on 67 pumping units as of March 2021
- Adding enhanced dual fuel measurements and reporting
- Optimizing power end lubrication circuit
- Adding vibration testing and analytics
- Completing 100% 3D model for all pump configurations for FEA and CFD modeling



# Dual Fuel Technology

Dual Fuel conversions on Frac pumps allow Natural Gas to be substituted for diesel while the unit is in operation.

- Less diesel = CO<sub>2</sub> and other emissions reduction
- Natural gas used from line gas leads to substantial saving to the operator
- Substitution rates typically vary from 40% to 60% for Cummins QSK50
- Eliminates approximately 50% of diesel deliveries to and from location
- Natural gas CO<sub>2</sub> emissions are 27% less than diesel burning emissions and 80% less NOX



# Cost Benefit to the Customer (Dual Fuel)

- As previously noted, the substitution of natural gas adds the benefit of reduced cost for the customer due to natural gas being cheaper than diesel.
- For each gallon of fuel replaced, approximately 0.132 mcf of natural gas is used.
- Average off-road diesel price reported is \$2.70/gallon.
- Below is an example of annual savings running a dual fuel fleet.

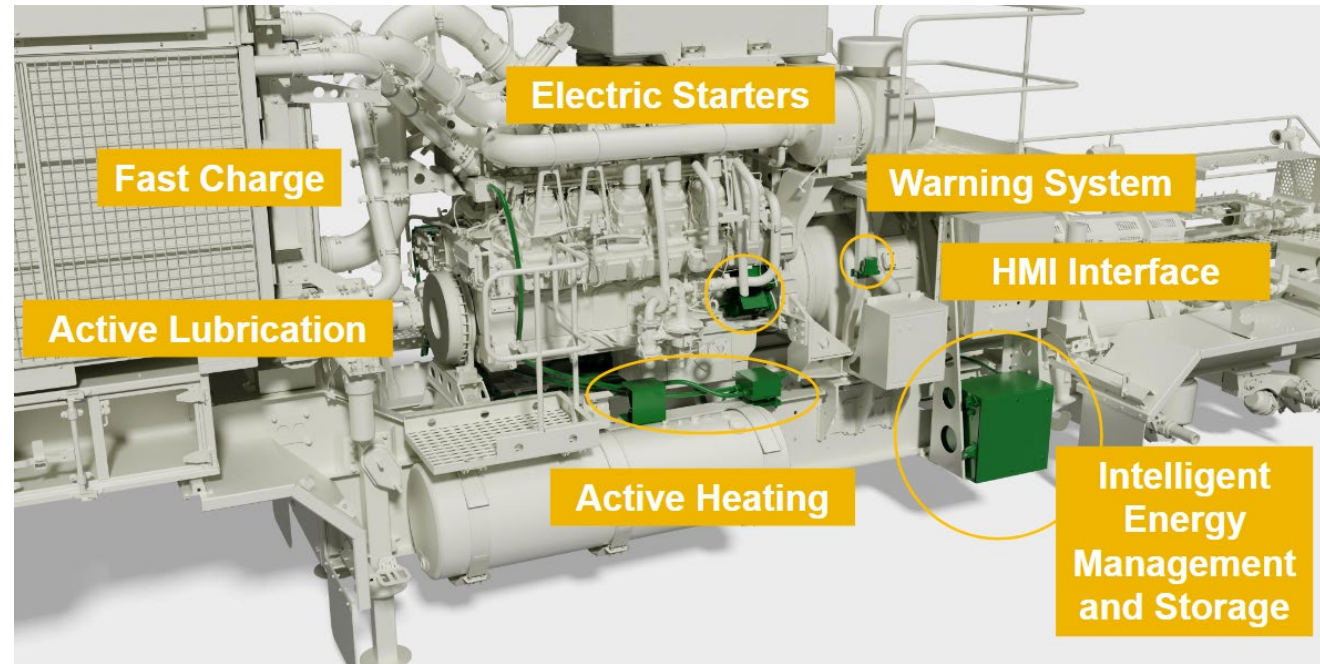
Tier IV	Diesel (Gallons/Hour)	Natural Gas (mcf/hour)	Diesel Saved	Diesel Cost Per Hour/Pump	Natural Gas Cost Per Hour/Pump	Savings Per Pump Per Hour	Pump Hours Per Day	Pumping Days Per Month	Pumps Inline	Annual Savings
Traditional Diesel	120		0	\$ 324.00			14	25	18	
Dual Fuel (40% sub)	72	6.34	48	\$ 194.40	\$ 14.57	115.03				\$ 8,696,056
Dual Fuel (50% sub)	60	7.92	60	\$ 162.00	\$ 18.22	143.78				\$ 10,870,070
Dual Fuel (60% sub)	48	9.50	72	\$ 129.60	\$ 21.86	172.54				\$ 13,044,084

\* Assuming similar thermal engine efficiency in Diesel and Dual Fuel mode



# Engine Standby Controller (ESC)

- By using electric starts, the Engine Standby Controller replaces the existing hydraulic start and wet kit on the frac unit.
- The ESC system will automatically shut off the unit once it is in idle and the engine has cooled off sufficiently.
- Benefits include fuel cost savings, carbon footprint reduction, and less downtime for equipment maintenance.



# Cost Benefit to the Customer (ESC)

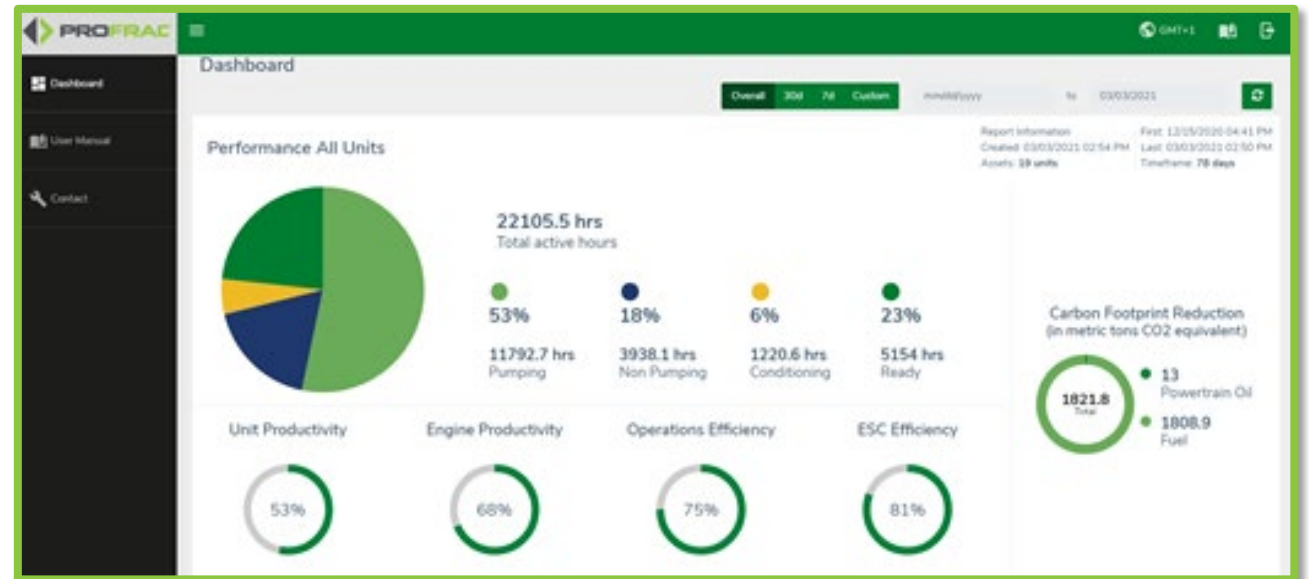
- The ESC will eliminate approximately 90% of idle time on the equipment.
- Below is an example of annual savings running a fleet equipped with ESC.

Tier IV	Diesel (Gallons/Hour)	Idle Hours/Day	Pumping Days Per Month	Pumps Inline	Idle Fuel Cost Per Day/Pump	Idle Fuel Cost Per Day/Fleet	Gallons Per Day Consumed/Fleet	Gallons of Fuel Reduced	Daily Fuel Savings	Annual Fuel Savings
Traditional Diesel	15	10	25	18	\$ 405.00	\$ 7,290.00	2,700.0			
ESC	15	1	25	18	\$ 40.50	\$ 729.00	270.0	2,430.00	\$ 6,561.00	\$ 1,968,300



# SOPHIA and Carbon Footprint Transparency

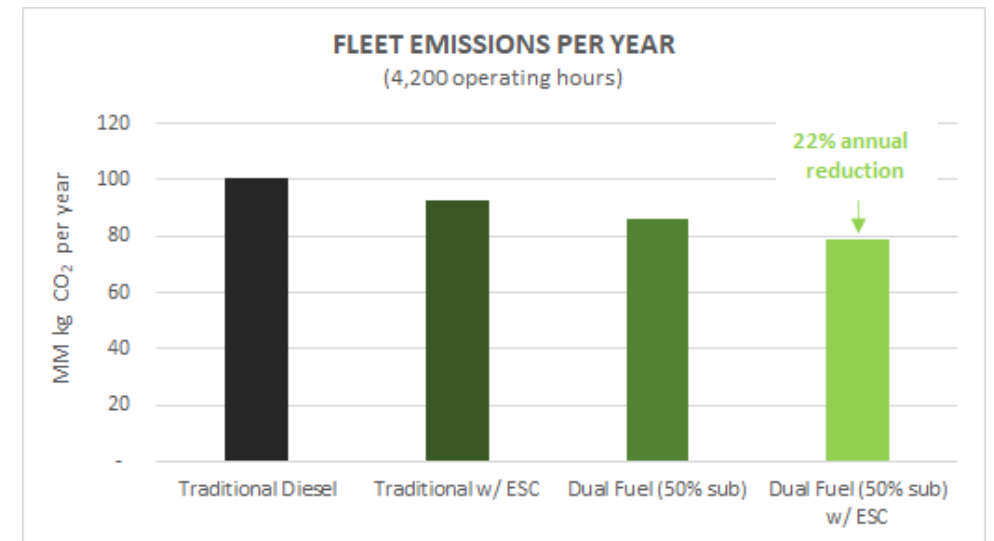
- SOPHIA is a cloud-based platform that accompanies the ESC to provide visibility into fuel savings and carbon footprint reduction
- Enhances the credibility, consistency, and transparency of Carbon Footprint (CFP) quantification by following ISO standards
- Reliable CFP reporting



# Emission Reductions

## Dual Fuel and ESC

- The chart to the right illustrates estimated emissions reductions from the use of dual fuel and ESC technologies
- Assumptions:
  - CO<sub>2</sub> Emissions Coefficients per the EIA are 10.16 kg/gallon of diesel fuel and 53.12 kg/mcf of natural gas
  - A current ProFrac Tier 4 engine consumes approximately 15 gal/hour of diesel fuel during idle and 120 gal/hour during normal operation
  - ProFrac averages 40% idle time across all locations



**22% ANNUAL REDUCTION IN EMISSIONS PER YEAR**





# ProFrac Commitments

- We are proud to be a part of providing affordable and reliable energy to people around the world, and we are committed to reducing the impact of our activities on the environment.
- As such, we are striving to quantify the carbon footprint of our operations and identify specific reduction targets by the end of 2021.
- Together with EKV, we will deliver and continuously improve carbon footprint data to our customers.
- We are already investing in carbon reducing technologies and will continue to do so.





**Thank you!**

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