

Technology Fact Sheet

Irrigation is an energy-intensive farming operation. Owing to stricter emissions regulations and the substantial rise in the cost of gasoline and diesel in recent years, growers are exploring alternative fuels and taking steps to upgrade the overall efficiency of their irrigation systems.

Advanced propane-fueled stationary irrigation engines offer increased efficiency and reliability with reduced maintenance needs. Achieving Environmental Protection Agency and California Air Resources Board certification for the Ford 3.7-liter, Buck's General Motors 5.7-liter, Buck's 8.0-liter, Origin 8.0-liter, and Origin 10.3-liter irrigation engines ensures that this cost-effective and efficient equipment can be sold to growers nationwide.



The total energy expenses for on-farm pumping of irrigation water reached \$2.68 billion in 2008 — a 73 percent increase since 2003.
—Table 20, 2008 USDA Farm and Ranch Irrigation Survey



Current Status: Commercialization Phase

Research → Development and Testing → Demonstration → **Commercialization**

- Buck's GM 5.7-liter Vortec powertrain engine received EPA and CARB emissions certification in 2009.
- Buck's 8.0-liter engine received EPA and CARB emissions certification in December 2011.
- EPA and CARB emissions certification of the Origin 8.0-liter, Origin 10.3-liter, and Ford 3.7-liter engines is expected in 2012.

Technology Features

- 3.7-liter six-cylinder and 5.7-liter, 8.0-liter, and 10.3-liter eight-cylinder large spark-ignited engines.
- Dry fuel valve train.
- Hydraulic roller lifter camshaft.
- Induction-hardened inlet valve seats.

Propane Irrigation Engines: Key Benefits

Ensure reliable irrigation without grid-related power interruptions.

Produce up to 24 percent fewer greenhouse gas emissions than gasoline and 11 percent fewer GHG emissions than diesel engines.

Eligible for sale in all 50 states after EPA and CARB emissions certification.

Can cost up to 14 percent less to purchase and operate than diesel irrigation engines.

Reduce irrigation engine maintenance costs by decreasing deposits on engine components.

Consume about 4,000 to 10,000 gallons of propane per year, depending on engine size.

For more information on this and other research projects, go to www.agpropane.com.

A Closer Look

Engine Uses Extend Beyond Irrigation

Spark-ignited stationary engines like the Ford 3.7-liter, Buck's GM 5.7-liter, Buck's 8.0-liter, Origin 8.0-liter, and Origin 10.3-liter engines can be used in irrigation pumps and other harvest equipment, prime and backup generators, skid-steer loaders, and wind machines.

In July 2008, EPA mandated that all new or reconstructed propane-fueled engines sold in the United States must be emissions certified. PERC and engine manufacturers responded to this regulation to ensure continued use of these reliable, powerful, efficient engines in the full range of applications.



GM 5.7-liter engine

Projects:

U.S. EPA Certification of Buck's 8.0-liter Stationary Engine (**Docket 17086**)
Origin Engines 8.0-liter and 10.3-liter Industrial Engines (**Docket 16909**)
EPA and CARB Certification of Ford 3.7-liter Industrial Engine (**Docket 16081**)
U.S. EPA Certification of Buck's GM 5.7-liter Stationary LPG Engine (**Docket 15667**)

Partners:

Buck's Engines, Origin Engines, Engine Distributors Inc.

Research Process (✓ = completed; ➤ = in progress; ★ = upcoming)

Development and Testing

Ford 3.7-liter engine ➤

Buck's GM 5.7-liter engine ✓

Buck's 8.0-liter engine ✓

Origin 8.0-liter and 10.3-liter engines ➤

- Conduct laboratory testing to collect data about emissions, performance, fuel consumption, and power.
- Submit emissions data to EPA and CARB.
- Achieve EPA and CARB emissions certification for constant-speed, stationary, large spark-ignited engines.

Commercialization

Ford 3.7-liter engine ★

Buck's GM 5.7-liter engine ✓

Buck's 8.0-liter engine ✓

Origin 8.0-liter and 10.3-liter engines ★

- Market and sell the certified engines in all 50 states.
- Promote the engines to industry and through dealer training and materials dissemination at agriculture trade shows.

What's Next?

Buck's GM 5.7-liter engine and Buck's 8.0-liter engines are commercially available. Commercialization of the Origin 8.0-liter and Origin 10.3-liter engines is expected in early 2012. Commercialization of the Ford 3.7-liter engine is expected in 2012.



FOR MORE INFORMATION:

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