Argonne NATIONAL LABORATORY

HARNESSING RENEWABLE NATURAL GAS TO POWER TODAY'S TRUCKS

RNG gives fleets affordable fuel choice

Ozinga runs its entire mixed fleets of concrete mixers, semis and light trucks on natural gas.
Image Credit: Ozinga

Ozinga is saving energy, cutting emissions, and improving their bottom line with RNG—a clean, affordable, domestic, drop-in fuel with extensive delivery infrastructure—in a new generation of natural gas trucks.

CHALLENGE

Heavy trucks underpin our economy, transporting both finished goods and the materials that go into them. Improving truck efficiency and reducing truck operating costs result in lower energy costs throughout the supply chain as well as enhanced bottom lines for individual trucking companies. Heavy trucks also consume a quarter of the energy used in U.S. transportation,[1] producing a similar share of the sector's greenhouse gas (GHG) emissions and accounting for roughly half of the current emissions of nitrogen oxides (NOx) and soot or particulate matter (PM) from highway vehicles.[2]

While trucks powered by batteries and hydrogen fuel cells may provide emission-free transport, those technologies often cannot meet the cost and performance needs of today's heavy truck fleets. By contrast, natural gas (NG) is abundant, affordable, and able to meet those needs thanks to a new generation of NG engines that can be fueled with fossil or renewable natural gas (RNG), both of which are significantly less expensive than diesel. Since RNG is equivalent to fossil NG both in price and on the molecular level, RNG provides the added benefit of significantly reducing emissions at a competitive price while enabling fleets to maintain current schedules and operating procedures.

STRATEGY

As a long-time member of several Clean Cities and Communities coalitions,[3] Ozinga Bros., Inc., has long sought to improve the energy efficiency of its bulk materials and concrete solutions business. In 2011, Ozinga saw that using compressed natural gas (CNG) could benefit both its competitive advantage in the marketplace and the environment. Pursuing an early adopter strategy that leveraged its market position, logistical expertise, and grants from the U.S. Department of Energy (DOE) and other agencies, Ozinga began transitioning its fleet to CNG. Ozinga also created a new business unit—Ozinga Energy—to develop, deliver, and sell CNG and RNG and to provide electric vehicle (EV) charging solutions to other fleet operators, as well as logistics support to the waste and bulk materials industries.

1 Davis, S., and R. Boundy, Transportation Energy Data Book Oak Ridge National Laboratory, Ed. 40, ORNL/TM-2022/2376, 2022.
2 National Emissions Inventory, U.S. Environmental Protection Agency, 2024.
3 These include Illinois Alliance for Clean Transportation (IACT), Drive Clean Indiana (DCI), and Valley of the Sun Clean Cities.

U.S. DEPARTMENT of ENERGY
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Ozinga's fleet of natural gas vehicles runs entirely on renewable fuel significantly cutting diesel use, reducing carbon and particulate emissions. Image Credit: Ozinga

IMPACT

The entire Ozinga business enterprise currently operates a fleet of over 300 heavy-duty natural gas vehicles (NGVs), including concrete mixers and semitrucks, along with approximately 50 other NG-fueled support vehicles. Of these, Ozinga Energy operates a fleet of 50 light- and heavy-duty NGVs. All the NG consumed by these Ozinga vehicles is renewable, displacing roughly 800,000 gallons of diesel fuel annually. Replacing that diesel with cleaner-burning RNG translates into approximately 11,000 fewer tons of carbon emissions per year, along with significant reductions in emissions of NOx and PM.

Ozinga Energy operates seven CNG/RNG fueling stations, which serve both Ozinga's own fleet as well as those of other companies—providing critical infrastructure for the growing CNG/RNG marketplace in Illinois, Indiana, Michigan, and Florida.[4] At those stations, the CNG/RNG mix sells for approximately $3.00 per diesel gallon equivalent (dge).

Most of the RNG sold at Ozinga stations comes from landfill gas. While RNG from sources other than landfills has less carbon per volume but a higher production cost than RNG from landfills, that production tends to flow to states with Clean Fuel Standards (CFS), which provide large incentives for fuels with very low (or negative) carbon per unit volume.

Ozinga Energy has responded to the demand for lower carbon RNG by partnering with three dairy farms to build a manure-to-RNG project in Indiana that sells RNG in CFS states. This project captures methane that otherwise would have been emitted into the atmosphere and cleans the resulting gas to pipeline quality, creating RNG. When compressed and dispensed into a NG truck, the RNG further reduces carbon emissions by displacing the diesel that would have been consumed by a conventional diesel truck, resulting in extremely low carbon emissions.

In this Indiana project, manure from over 15,000 animals is digested in anaerobic digesters, and Ozinga Energy operates the gas treatment plant that produces carbon-negative RNG that is dispensed through third parties throughout California.

Separately, in Arizona, Ozinga Energy transports manure from several farms to a central digester, which produces carbon-negative RNG destined for California. Ozinga Energy also transports the milk produced at those dairy farms to a nearby processing plant.

In early 2024, one of Ozinga Energy's trucks was equipped with Cummins' 15-liter NG engine (known as the X15N engine) as part of Cummins' pre-production development and testing program. That truck has achieved excellent performance and reliability over tens of thousands of service miles. Ozinga Energy has taken delivery of 15 X15N-equipped Kenworth T880s and has additional units on order.

Ozinga Energy's RNG-related business directly employs close to 50 employees, excluding the drivers of RNG-fueled concrete trucks operated by the Ozinga Ready Mix business enterprise. As an early adopter and industry leader, Ozinga shows other fleet operators how RNG can benefit both the marketplace and the environment—and successfully leverage federal funding and incentives.

ABOUT OZINGA ENERGY

A unit of family-owned Ozinga Bros., Inc., Ozinga Energy provides a range of alternative fuel solutions, including RNG, CNG, and EV charging. A national leader in CNG solutions, the company operates the largest public CNG/RNG fueling network in Chicagoland. Ozinga Energy also provides construction, service, and preventive maintenance for many CNG, RNG, and EV applications, as well as logistics services with a fleet of NG-powered trucks.

IMPACT BY THE NUMBERS

- **Entire Ozinga CNG/RNG fleet (on the road):**
  - 300 concrete mixers and semitrucks
  - 50 other vehicles
- **Amount of CNG/RNG consumed:** 900,000 gallons/year of gasoline equivalent
- **Amount of diesel displaced:** 800,000 gallons/year
- **Net environmental impact from displacing diesel with RNG:**[5,6]
  - 1,750 tons/year of NOx
  - 11,000 tons/year of CO_2
- **Number of fueling stations:** 7

CONTACT

Marianne Mintz
Principal Energy Analyst
Phone:630-252-5627
Email: mmintz@anl.gov
www.anl.gov/esia/clean-cities

4 Five of those stations are accessible to the public and to fleets with prior contracting arrangements. Ozinga Energy also provides construction, operations, and maintenance services to NG stations in Illinois, Indiana, Wisconsin, Minnesota, Missouri, California, Washington, Arizona, Florida, and Michigan.

5 For example, the cost of gas production, cleanup, and injection into the NG distribution system averages less than $10/MMBtu (or $1.25/dge) from landfills but can be twice that amount when sourced from livestock operations.

6 Burnham, A. "AFLEET Tool 2023." Argonne National Labora tory. Accessed January 2025 at https://greet.es.anl.gov/afleet_tool.