

# Optima-KV: North Carolina's First Swine Manure Renewable Natural Gas (RNG) Project

## Location:

Duplin County, North Carolina

## Partners:

OptimaBio, LLC;  
Cavanaugh & Associates  
LLC; NC Ag Finance  
Authority; Live Oak  
Bank, Smithfield Foods;  
Duplin County Economic  
Development; USDA  
REAP Program

## Contact:

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## Feedstock:

Manure from about  
60,000 hogs

## Biogas End Use:

Injected into Piedmont  
Natural Gas (Duke  
Energy) pipeline for  
various local uses

## Maximum Annual Fuel Production:

80,000 MMBTU's  
(dekatherms) per year of  
renewable natural gas, or  
11,000 megawatt hours of  
electricity annually

## Received Funding:

Yes

## Technology Providers:

Guild Associates, Unison  
Solutions and Cavanaugh  
& Associates



*Duke Energy began purchasing its first North Carolina based Renewable Natural Gas (RNG) from the OptimaKV facility in the spring of 2019.*

## Project Summary:

In April of 2018, OptimaBio, LLC, a swine manure-to-energy project developer, commissioned its Optima-Kenansville (KV) project to maximize the environmental and economic value of North Carolina's hog manure resources. By mitigating negative impacts of the hog industry through capturing methane gas and transforming it into pipeline-quality renewable natural gas (RNG) for use by local utility, the Optima-KV project sets the sustainable pace in NC, the nation's second largest hog-producing state.

Optima-KV aggregates biogas produced at five contiguous swine farms in Kenansville, improving the economics of manure management and renewable energy production. Liquid and solid waste generated by the farms' combined 60,000 animals is directed into five newly constructed "earthen digesters" serving each farm. Through the process of anaerobic digestion, bacteria "feed" on the manure and organic waste, producing methane-rich biogas. A low-power compressor at each farm pulls the biogas from the digester, filters it for particulates and removes moisture through a simple condenser.

After this pre-conditioning step, partially upgraded biogas is transported through small diameter pipes to a centralized location on one of the farms, where it is pressurized and further purified to pipeline quality standards of at least 96% methane. The gas is then pressurized again for injection into Piedmont Natural Gas' pipeline. Rather than each farm having its own purification center, aggregating the biogas-- rather than the manure-- takes advantage of cost efficiencies and ensures the farms' biosecurity requirements. Thus, bioenergy is being produced while the farmers continue with their normal operations.

The Optima KV Project has a 15-year RNG off-take agreement with Duke Energy for 100% of the RNG produced. The gas is being combusted at a Duke combined-cycle power plant. Duke Energy (through its subsidiary, Piedmont Natural Gas) is purchasing 100% of the Optima project's biogas to meet a state-required mandate that 0.2 percent of energy come from hog waste by 2023. This is the first in-state swine project producing RNG toward meeting that mandate, and the first RNG injection project of any kind in North Carolina.

## Financing:

Based on its technical merits, the project has been awarded a \$500,000 grant through USDA's REAP program. REAP loan guarantees from USDA for 70% of the project debt and an allocation of Qualified Energy Conservation Bonds (QECB). Live Oak Bank, in partnership with USDA, is the primary funder of the project.