

Renewable Natural Gas (RNG)

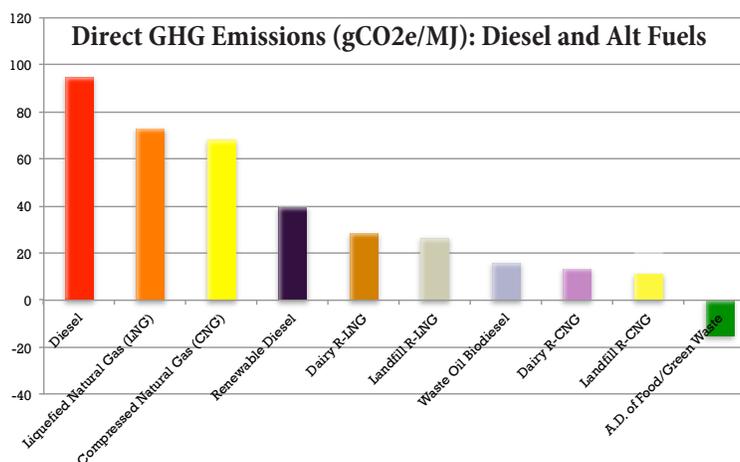
A Clean, Secure, Commercially Viable Replacement for Diesel Fuel Today

RNG: The Solution to a Major Transportation Problem

RNG is just like fossil natural gas – but better: While RNG is interchangeable with fossil natural gas, it has a big difference. It is sustainable year after year, being made from gases emitted by organic wastes like household garbage, commercial food waste and livestock manure, to name a few. By capturing these gases from landfills, farms, or anaerobic digesters, RNG has close to zero carbon emissions on a lifecycle basis (see chart below).¹

RNG can be made in commercial quantities now: Organic wastes thrown away daily in every city, town, and rural region can be turned into enough RNG fuel – with today’s off-the-shelf technology – to displace between 16% and 25% of diesel vehicle fuel used in the U.S.²

RNG could displace much more in the future: Thermal gasification technologies, now on the horizon, can turn woody wastes into fuel as well, greatly expanding usable feedstocks for RNG production. Through “anaerobic digestion” and “gasification,” RNG could displace more than 45% of on-road diesel fuel, or 17.9 billion gallons annually. However, RNG and fossil natural gas — using commercial technology(s) — could displace ALL on-road diesel, eliminating almost 25% of the petroleum-based highway fuel consumed in the U.S. today.



Derived from CA Air Resources Board LCFS, 2012.

RNG frees “workhorse” truck and bus fleets from oil: The ten million U.S. trucks and buses provide essential services to American communities, and they transport goods and services worth nearly 70% of the GDP.³ These vehicles use 23% of all highway fuel,⁴ almost entirely high-carbon diesel, produced from petroleum (much of which is imported), whose price and availability are set by many producers and suppliers with interests not necessarily allied with our own. Fossil and renewable natural gas are among the only clean, secure fuels able to replace major quantities of diesel, freeing this crucial vehicle sector from its reliance on oil.

1. California Air Resources Board (CARB), 2009/2012. <http://www.arb.ca.gov/regact/2009/lcfs09/lcfsfsor.pdf>

2. The 16% estimate comes from the American Gas Foundation. The Potential for Renewable Gas. September 2011. The 25% estimate comes from an earlier study commissioned by the U.S. Department of Energy: QSS Group (1998). Biogas for Transportation Use: A 1998 Perspective.

3. U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics; and U.S. Department of Commerce, U.S. Census Bureau, 2007 Economic Census: Transportation Commodity Flow Survey, December 2009.

4. U.S. Department of Transportation, Federal Highway Administration, Highway Statistics, 2007.

Why are trucks and buses so important when it comes to oil?

The 10 million trucks and buses in the U.S. consume close to 38 billion gallons of diesel a year – 23 % of all on-road fuel – made from crude oil, costing the country \$80 million a day in net imports and producing 422 million tons of tailpipe CO2 emissions annually.⁵

RNG requires no breakthroughs in engines or infrastructure: RNG is an easy fuel to introduce because no scientific or engineering challenges impede its broad commercial adoption. Mature, proven technologies for natural gas engines, fueling, transport and storage are deployed across the U.S.



RNG Means a Stronger Economy and New Jobs

RNG production can create thousands of permanent non-exportable jobs: Every city, town, and rural area in the U.S. can turn its organic wastes into fuel. Rural areas, in particular, can benefit because more than half the waste feedstocks come from farms and crop residues. A 2011 American Gas Foundation study estimated that design, construction and operation/maintenance of RNG facilities supplying fuel to displace 45% of on-road diesel could create as many as 250,000 jobs.

RNG increases the economic and environmental value of wastes: RNG production turns every community's discards into prized resources. It can divert wastes from landfills, reduce methane emissions, and lead to non-exportable jobs. After making RNG, what remains are nutrient-rich fertilizers and soil-enhancing organic materials.

RNG use will help meet U.S. Environmental Goals

RNG slashes carbon emissions to near zero: RNG's carbon footprint, measured over the "life cycle" of the fuel's production, transport and use, is the lowest of any vehicle fuel that is commercially available today, according to research by the CA Air Resources Board.⁶ Its use as a vehicle fuel represents a 50% or more reduction in GHG emissions compared to diesel vehicles when derived from landfill gas, and as much as a **120%** reduction when produced via anaerobic digestion of food waste.⁷

RNG means cleaner air: Vehicles powered by RNG and fossil natural gas produce up to 80% fewer nitrogen oxide (NOx) emissions than pre-2009 diesel engines and virtually no particulate (PM) emissions, without the need for expensive pollution controls that new diesel models must use.⁸

Why is it smart to use RNG fuel for vehicles?

Many renewable energy sources – wind, solar, hydro, geothermal, etc. can be used to generate power. But only conventional and renewable natural gas can replace a significant amount of oil in transportation while safeguarding U.S. national security and strengthening the economy.

For more on RNG, check out our report, *RNG: The Solution to a Major Transportation Problem*, available for download on our website at: energy-vision.org/resources/ev-publications/

5. Each gallon of diesel burned emits approximately 22.2 pounds of CO2

6. California Air Resources Board (CARB), 2015. <http://www.arb.ca.gov/regact/2015/lcfs2015/lcfs2015/lcfsfinalregorder.pdf>

7. California Air Resources Board (CARB), 2012. <http://www.arb.ca.gov/fuels/lcfs/2a2b/internal/hsad-rng-062812.pdf>

8. U.S. DOE: Alternative Fuels and Advanced Vehicles Data Center. http://www.afdc.energy.gov/afdc/vehicles/emissions_natural_gas.html



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