# Natural Gas Fleet Case Study


## CR&R Environmental Services

CR&R Environmental Services is an innovative waste and recycling collection company that serves more than 3 million people and 50,000 businesses throughout Southern California. The company operates one of the cleanest and most advanced fueling operation of any refuse fleet in the U.S.

CR&R was an early adopter of natural gas vehicles, having deployed its first CNG collection truck in 2002. The company is further reducing its NOx emissions by integrating the new Cummins Westport near-zero-emission (NZE) 0.02 g/bhp-hr NOx natural gas engine into its fleet (32 will be deployed in the near-term).

CR&R is also helping California meet its waste diversion goals by converting organic waste streams, that would have otherwise been deposited in landfills, into biogas via a state-of-the-art anaerobic digester. The biogas is further refined into renewable transportation fuel to power CR&R's fleet, as well as to distribute carbon-neutral fuel through SoCalGas' pipeline infrastructure (the first interconnect project to be completed in California). The anaerobic digester facility was funded in partnership with the California Energy Commission, CalRecycle, and the South Coast Air Quality Management District (SCAQMD). CR&R secured additional funding through the SCAQMD's Prop 1B Goods Movement Emission Reduction Program to help offset the incremental costs of CNG vehicles.

**"We can report positively, we've had no adverse effects from the performance related to operating the 0.02 NOx engine."**

- David E. Fahrion, President, Solid Waste Division


### 350+ CNG Trucks

in the CR&R waste and recycling collection fleet

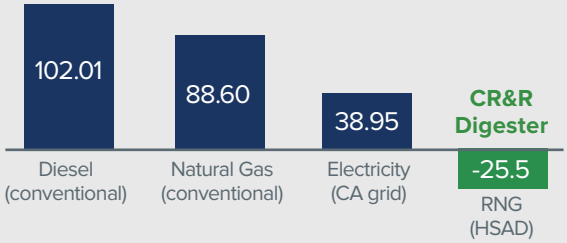

### 250+ collection trucks

will be fueled annually by the RNG produced by CR&R's permitted anaerobic digester facility once fully operational (estimated total supply: 2.7 million DGE)


### 90% NOx Reductions

will be acheived simply by using NZE Cummins Westport 0.02 g/bhp-hr NOx engines. The 32 CR&R trucks with these engines will achieve an additional 70% GHG reduction due to the closed crank case design.

**Carbon Intensity Rating of Key Transportation Fuels***




*Source: www.arb.ca.gov/fuels/lcfs/fuelpathways/pathwaytable.htm, CARB, February 2017. Adjusted for heavy-duty truck applications. HSAD pathway is EER-adjusted by the CARB formula (-22.93 base CI divided by EER of .9), even though this IMPROVES its CI score.

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