

# WasteAdvantage magazine

The Advantage in the Waste and Recycling Industry

## New Energy Vision Report Analyzes Non-Petroleum Fuel Options for Waste & Recycling Fleets

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The sustainable energy NGO Energy Vision published a new report on waste and recycling collection truck fleets, entitled *The Refuse Revolution*. It assesses various alternative fuels and new vehicle technologies for reducing greenhouse gas emissions and other negative impacts from refuse trucks. The report includes data on overall methane emissions related to waste disposal. Methane is at least 86 times more potent than carbon dioxide over a 20-year time frame, and landfills are the third largest source of methane emissions. That uniquely positions the waste and recycling industry to leverage significant climate benefits by reducing its methane footprint. The Energy Vision report finds that one alternative fuel in particular which refuse trucks can use – renewable natural gas made from organic waste (RNG) – could drastically reduce U.S. methane emissions, a goal which is high on the climate policy agenda. “A strong, meaningful legislative agenda must include clean transportation and reducing methane emissions,” said Rep. Paul Tonko of New York’s 20th District. “This Energy Vision report shows that businesses can be resourceful in producing the low- and no-carbon fuels and technologies essential for a more fair, just, and sustainable economy.”

### Why Focus on the Refuse Sector?

The 180,000 refuse trucks currently operating in the U.S. have a large environmental footprint. All heavy-duty trucks and buses combined make up just 4% of vehicles on U.S. roadways, yet they consume over 20% of all on-road vehicle fuel. Since they rely on carbon-intensive petroleum diesel fuel, heavy trucks and buses account for a quarter of the transportation sector’s GHG emissions, helping to make it the largest GHG-emitting sector in the U.S. Diesel exhaust from heavy trucks and buses is also a significant source of health-damaging nitrogen oxides and small particulates, and a significant cause of circulatory and respiratory disease as well as lung cancer, especially in low-income and environmental justice communities.

### Nine Alternative Fuel and Vehicle Technology Strategies

The report examines nine options refuse fleets can use to lower their impacts, ranging from biodiesel and

renewable diesel, to fossil and renewable natural gas, to hybrid technologies, to battery electric vehicles, DME, and hydrogen. It offers key metrics and considerations that refuse fleet owners and operators can use as they make procurement decisions about purchasing new trucks and fuels. The criteria it uses to compare the relative merits of each strategy include cutting greenhouse gases, reducing health-damaging nitrogen oxides and particulate emissions, fuel availability, fuel cost, environmental impacts of fuel production, and the overall performance and commercial status for each strategy.

“It is impressive how the waste and recycling industry has pursued the task of finding cleaner, lower-carbon fuels and new vehicle technologies,” according to Matt Tomich, President of Energy Vision and lead author of the report. “All the alternative fuel and technology options the report assessed had meaningful climate and clean air advantages over petroleum diesel. Each one had benefits and drawbacks, and the varying needs of refuse fleets mean that right now there is no ‘one size fits all’ solution. However, some approaches turned out to be much more impactful than others.”

### **Focusing on “Lifecycle” Emissions**

Claims that battery electric vehicles (BEV) are “zero emission” vehicles aren’t justified, the report finds. In fact, a comprehensive review of Argonne National Laboratory’s Greenhouse Gases, Regulated Emissions, and Energy Use in Technologies (GREET) model concluded that there is no such thing as a “zero emission” truck. Every fuel and vehicle type generates emissions somewhere in its lifecycle, from raw material or fuel extraction/production to energy consumption. BEV trucks are no exception. The heavy weight of their batteries causes them to stir up road dust and increases tire wear, generating significant particulate pollution. In fact, some studies indicate that BEV particulate pollution is greater than that of diesel trucks.

While BEV trucks have no tailpipe emissions, they have considerable lifecycle emissions. Charging their batteries depends on the U.S. electrical grid, 58% of which is powered by fossil fuels. In order for BEV trucks to be a sustainable alternative to petroleum diesel trucks, their batteries would have to be powered by renewable energy sources, and the labor, toxic pollution, and land degradation problems with battery production and disposal would have to be solved. *The Refuse Revolution* assessment finds BEV truck technology to be in its infancy, and not ready for widespread use. With less than 50 in service today, they lack an operational track record demonstrating reliability, and their capital costs are nearly 70% higher than that of diesel trucks.

### **Greatest Benefits at Lowest Cost**

Of the nine strategies analyzed, the report found trucks equipped with natural gas engines powered by organic waste-derived renewable natural gas (RNG) fuel achieved the greatest benefits at the lowest cost. RNG trucks rated highest in terms of performance, cost, and cutting lifecycle GHG emissions, health-damaging pollutants, and more. There are approximately 10,000 refuse trucks powered by RNG fuel in the US today. They are affordable, costing just \$35,000 more on average than diesel trucks, with lower maintenance costs. RNG is the lowest-carbon fuel available, and the only road fuel which can be net-carbon negative over its lifecycle. Producing RNG involves capturing the methane biogases emitted by decomposing organic wastes, and when food waste or manure serve as the feedstocks, more greenhouse gases are captured (preventing them from entering the atmosphere) in producing the fuel than are emitted by the vehicles using it. Trucks running on RNG also cut nitrogen oxides emissions 90% and significantly reduce particulate emissions compared to diesel.

## **RNG as a Strategy for Cutting Methane Emissions**

RNG production turns what was previously discarded as waste in this country into a valuable energy resource, creating economic benefits. Organic wastes including food wastes, green clippings, and agricultural wastes have long been sent to landfills, which is costly and a major source of methane emissions. Diverting those wastes into RNG production turns them into a clean fuel which prevents methane emissions.

Methane from decomposing organics in landfills, on farms, and at wastewater treatment plants account for 30% of total U.S. methane emissions. Currently, a portion of this methane is captured and refined to produce nearly 500 million gallons of RNG fuel a year, but that is roughly just 5% of overall potential RNG production. Tripling current production to 1.5 billion gallons of RNG a year would produce enough fuel for every refuse truck in the U.S. Full potential RNG fuel production from all available feedstocks would be about 10 billion gallons of RNG a year. *The Refuse Revolution* finds that realizing this potential could power every urban bus and truck fleet in the country, displace a quarter of all on-road diesel fuel demand, and cut total U.S. methane emissions by 15%.

That would get us halfway to the Methane Pledge target just set by the Biden Administration to cut methane 30% by 2030. The Pledge was announced at the COP26 climate summit in Glasgow. This year, the international scientific community UN Global Methane Assessment and the Intergovernmental Panel on Climate Change issued reports emphasizing that methane was a key lever for reducing global warming and that methane emissions must be cut almost in half within this decade to help keep warming within 1.5 degrees centigrade and avoid the worst impacts climate change.

“We’re already getting a preview of the devastating impacts of climate change, from storms like the ones in Kentucky and intensifying wildfires, droughts, floods, to melting polar ice and sea level rise, said Energy Vision’s founder Joanna Underwood. “That’s why we need to immediately adopt and scale clean energy strategies that reduce methane as well as carbon dioxide and other pollutants. Whenever fleet managers make procurement decisions, they’re not doing it in a vacuum; they’re connected to a complex web of global climate and environmental issues. *The Refuse Revolution* report is a resource to help navigate it, and choose the options that will do the most good.”