



## ORGANICS TO ENERGY CALIFORNIA WASTE HAULER TURNS YARD AND FOOD WASTE INTO VEHICLE FUEL

### Taking the Lead

The landscape in the waste management industry has always been dynamic. Over 20 years ago, when uncertainty caused others to hesitate, the Southern California recycling and waste collection company CR&R developed the nation's first large-scale solid waste processing facility. With organic diversion regulations to ban food waste from landfills and emission reduction goals on the horizon for many states and cities, CR&R is once again taking a leading role by investing in anaerobic digestion and maximizing the value of organic waste streams.

### Maximizing Value

Common options to recycle organic waste are the collection of gas from landfill, composting the waste or digesting the material to produce biogas. "The way we looked at it was to get the most value out of our organic waste" states Mike Silva, CR&R organics processing project leader. "Gas collection from the landfill can help reduce your emissions while generating some energy, but you lose the nutrients. Composting on the other hand recovers nutrients from the organics, but does not produce energy. By using anaerobic digestion, you can reduce your emissions, generate renewable energy and recover nutrients from the organics at the same time."



### One of the Largest Anaerobic Digestion Projects in the US

CR&R serves more than 2.5 million people and 25,000 businesses throughout Orange, Los Angeles, San Bernardino, Imperial, and Riverside counties. Expanding on their state-of-the-art recycling processes, CR&R will integrate the new anaerobic digestion plant into their existing operations in Perris, California. The system is permitted to process over 160,000 tons of organic waste per year in phase I and II, and expandable to process over 320,000 tons per year in three additional phases, making it one of the largest anaerobic digestion projects in the US.

Feed for the new system will include collected curbside "green material" and food scraps from CR&R's municipal waste collection customers, which requires a robust, flexible digestion process to ensure efficient biogas production. "After a worldwide search, Eisenmann's horizontal plug flow system stood out as the only technology that was able to provide the highest possible biogas conversion rates for the broadest range of feedstocks" says Mike Silva. "This flexibility and reliability is essential for the economic success of the project."

### Flexible Feedstocks and High Biogas Yield

Eisenmann, a global technology provider for environmental, renewable energy and manufacturing systems, has been in the US for over 40 years and realized 100 biogas installations worldwide. The biogas system is fully automated and continuously monitors and optimizes the digestion temperature and feed rate to maximize biogas yield. Each phase of the CR&R plant features four parallel, primary digesters that are automatically fed through conveyors and dosing bins. The digesters are equipped with a slow moving horizontal agitator to ensure proper mixing of the feedstock - maximizing exposure to biological colonies and facilitating gas release. Produced biogas is stored in a flexible, double membrane gas storage roof within the post digester.



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### Truck Fleet Runs on Natural Gas

The biogas is directed from the post digester to an upgrading unit. The upgrading process uses water scrubbing to remove the unwanted components from the biogas. The methane rich product gas is then ready to use by CR&R to fuel their fleet of collection vehicles with renewable natural gas (RNG) and to feed it into the SoCal Gas pipeline system. Overall, the anaerobic digestion plant is projected to generate approx. 1,000,000 Diesel Gallon Equivalent (DGE) of RNG per year per phase – and approx. 4,000,000 DGE at full completion of all four phases.

### Investing in the Future

The construction of phase one and two is finished and the plant has been running for nearly three years. With the realization of this anaerobic digestion system, CR&R maximizes the value of their organic materials. Diverting green waste away from the landfill to their new facility reduces the emission of greenhouse gases. To further lower the carbon footprint and improve the project's economics, the usage of the RNG for the collection vehicle fleet creates a sustainable closed-loop: The trucks are fueled with the gas that was produced from the organic waste that they collect. Remaining digestate, composed of non-digestible fibers and nutrients, are recycled to generate organic compost and other fertilizing products to replace chemical-based fertilizers that are widely used in agriculture, nurseries and the home-gardening industry.

“Our team has put an enormous amount of time and effort into developing this waste-to-biogas project” said Clifford Ronnenberg, Founder and CEO, “It is clear, the time is right to invest in the future of organics diversion. It’s the right decision for our business, the municipalities we service, and the environment.”

### Turning Today's Organic Waste into Tomorrow's Green Energy

*Anaerobic digestion is a series of biological processes in which microorganisms break down biodegradable material – such as food waste, green waste, manure, fats, oils and greases – in the absence of oxygen. One of the end products is biogas, which is combusted to generate electricity and heat, or can be processed into renewable natural gas and transportation fuels. The separated digestate can be composted or converted into other fertilizing products. The options with anaerobic digestion and biogas production provide a lot of flexibility for the future of renewable energy.*

#### Technical Data CR&R Plant (Phase I and II)

Feedstocks	Green Waste and Food Waste
Throughput	~ 160,000 tons/year
Digester Capacity	Digesters: 8 x 330,000 gal (1,250 m <sup>3</sup> ) Post digester: 2 x 660,000 (2,500 m <sup>3</sup> )
Nominal Biogas Flow	~ 900 SCFM
Diesel Gallon Equivalent Production	~ 2,000,000 DGE/year

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