



# THE ROLE OF BIOGAS IN ADVANCING RNG

Chris Voell, Co-Chair-Biogas Subcommittee  
Global Methane Initiative  
U.S. Environmental Protection Agency



Advanced Energy Conference  
March 27, 2018



*“In 2050, 76% of gas  
could be renewable.”*

Beate Raabe, Secretary General, Eurogas, the trade association representing the interests of the gas industry in Europe. (September 2017)

“After an 18-month research phase, the team identified a potential renewable energy production solution **utilizing landfill gas (LFG)** from the Big Run Landfill in Ashland, Kentucky...

L'Oréal USA announced that it has signed a 15-year agreement to purchase approximately 40 percent of the **RNG** produced from the Big Run Landfill.

The RNG L'Oréal USA purchases will be directed into the interstate **natural gas transmission system**.

L'Oréal USA's long-term purchase commitment of the **RNG was a key** underwriting component that led to the financing of the project.”

SOURCE L'Oreal USA

## L'Oréal USA to achieve carbon neutrality by 2019, shifts to renewable energy

By [Cassidy Mantor](#) - March 1, 2018

L'Oréal USA announced all 21 of its US manufacturing and operations facilities will achieve carbon neutrality by 2019. The company will shift its energy use to its solar arrays, wind turbines, and renewable natural gas.





# ST. LANDRY PARISH LANDFILL, LA

## SMALL-SCALE LFG RNG

---

1<sup>ST</sup> BIOGAS TO VEHICLE FUEL  
PROJECT IN LOUISIANA

2012: CONVERTED 50 CFM OF LFG  
INTO 200 TO 250 GGE/DAY

2015: OVER 600 GGE/DAY FROM  
ABOUT 190 CFM LFG

FUELING 10-12 COLLECTION TRUCKS

‘SATELLITE SYSTEM’ –  
TRANSPORTING RNG OFF SITE TO  
FUELING STATION (1<sup>ST</sup> IN THE US)





# KERN COUNTY DAIRY DIGESTERS, CA

## CALIFORNIA BIOENERGY'S KERN CLUSTER

---

Leverages CA  
Dept. of Food  
and Ag grant  
incentives for  
digesters

15 large dairies  
participating in  
the cluster



Capacity for 2.5  
million gallons  
diesel  
equivalent per  
year

Combines  
compressed  
natural gas and  
electricity  
production

15 MW base  
load (30 MW  
peak) electricity  
production



# GRAND JUNCTION WASTEWATER PLANT, CO

## FLEET FUELED WITH UPGRADED BIOSOLIDS DIGESTER BIOGAS

GENERATES 80 TO 100 CFM/DAY OF DIGESTER GAS

PRODUCES BETWEEN 400 AND 500 GGE/DAY

PIPED NEARLY 6 MILES TO CITY'S EXISTING CNG FUELING STATION

CNG FUELS CITY FLEET OF BUSES AND CITY REFUSE TRUCKS, STREET SWEEPERS AND PICK-UP TRUCKS

OFFSETTING ABOUT \$400,000 IN FUEL COSTS ANNUALLY

FEATURED ON NATIONAL GEOGRAPHIC CHANNEL IN OCTOBER 2017



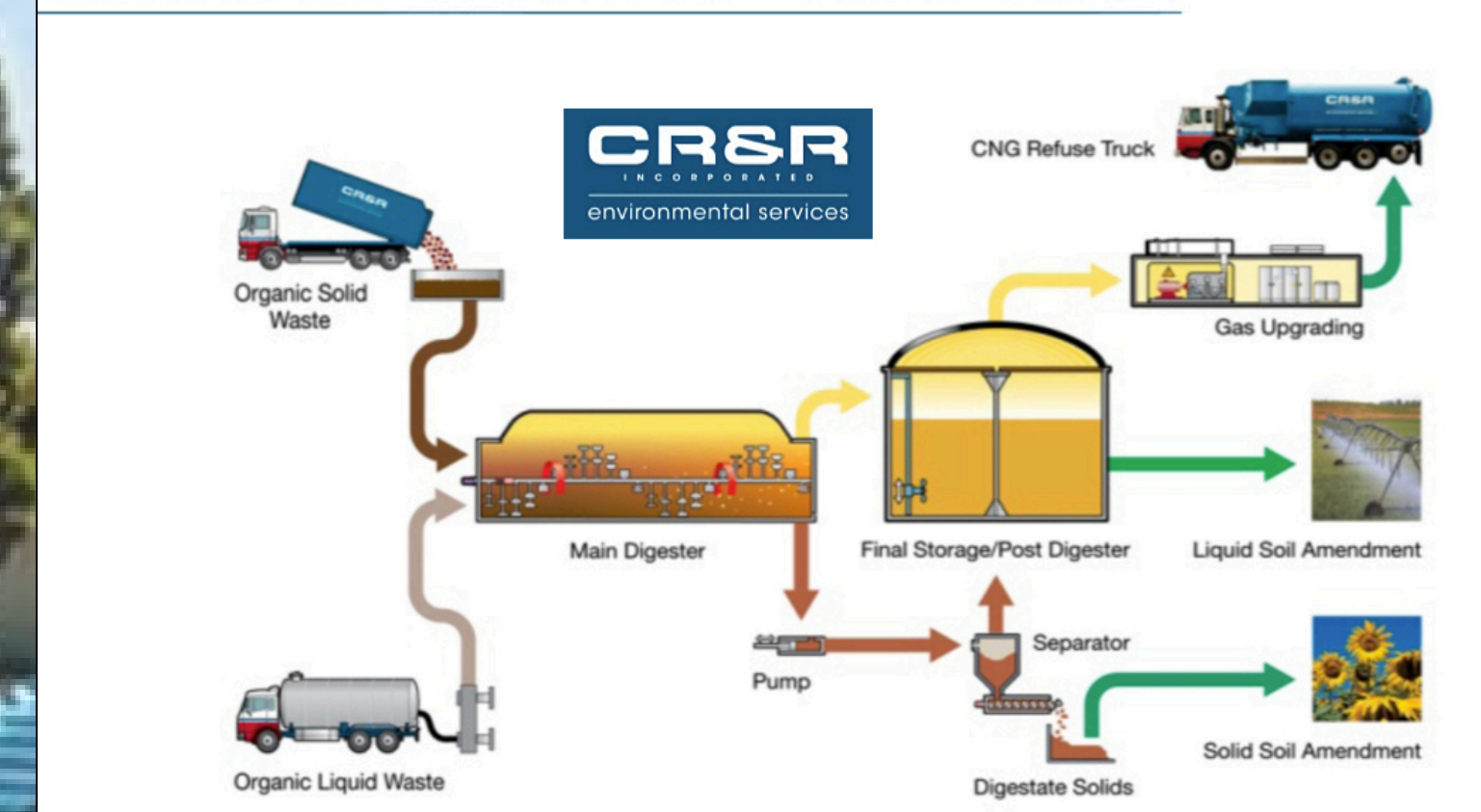


# CR&R AD FACILITY, CA

## UPGRADED BIOGAS FROM SOURCE-SEPARATED ORGANICS FUELS TRUCK FLEET AND PIPELINE INJECTION

- 230 TONS/DAY HIGH SOLID YARD AND FOOD WASTE
- GENERATING 1,200 CFM OF BIOGAS
- PRODUCING CNG FOR ~75 CR&R VEHICLES
- DIGESTATE USED TO PRODUCE CO-PRODUCTS
- 1<sup>ST</sup> SSO PROJECT IN CA TO PIPELINE INJECT RNG
- PROJECT CONTINUES TO EXPAND (4 PHASES)
- BY ~2020, PROJECT WILL GENERATE 4 MILLION GALLONS OF RNG AND 260,000 TONS OF FERTILIZER

### ANAEROBIC DIGESTION - FLOW CHART

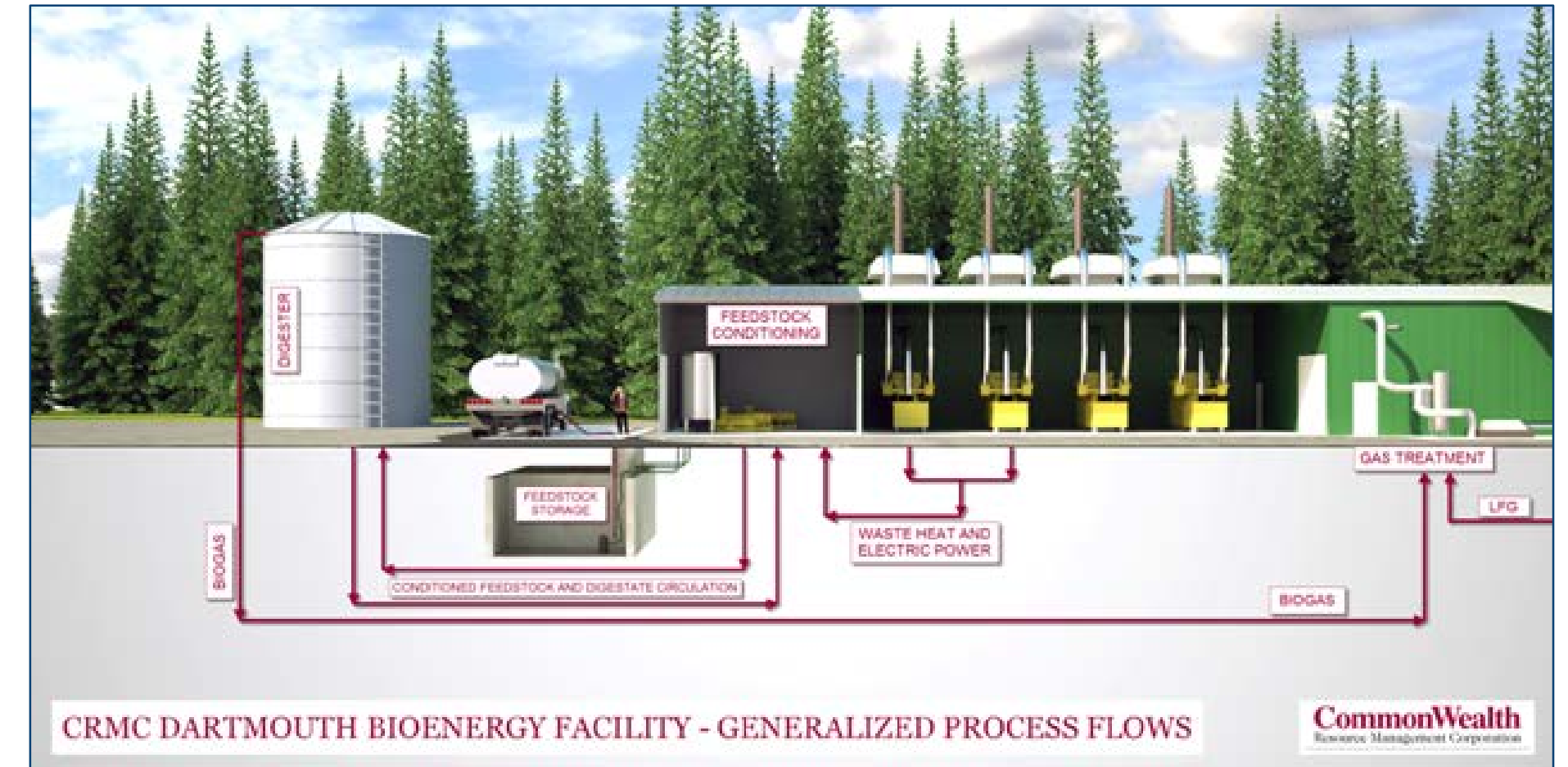




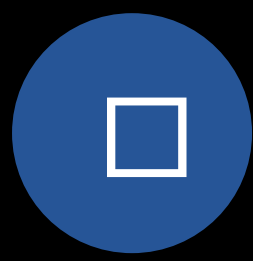
# CRMC PROJECTS AT CRAPO HILL LANDFILL, MA

## ADDING ORGANIC WASTE DIGESTION TO EXISTING LFG ENERGY PROJECT

- CRAPO HILL LF'S 3.2-MW ENGINE PROJECT ONLINE IN 2005
- STATE OF MA IMPLEMENTED COMMERCIAL FOOD WASTE DISPOSAL BAN IN 2014 (LARGE GENERATORS)
- ANTICIPATING LESS LFG AVAILABILITY LONG-TERM, DEVELOPER CRMC BUILT A FOOD WASTE AD FACILITY AT THE LF
- 2016 PILOT PROJECT SUCCESSFULLY COMBINED AD GAS WITH THE LFG TO BOOST OUTPUT BY ~100 KW
- EXPANSION PLANNED FOR 2018 TO INCREASE AD CAPACITY FROM 5,000 TO 30,000 GAL/DAY – WILL ADD ~800 KW
- MAY ALSO INJECT DIGESTATE INTO LF TO BOOST LFG FLOW







# THINK BIG - WHERE COULD WE GO WITH AD AND BIOGAS MARKET?

## RNG TRUCKS

...to haul all the dairy and meat products in North America

## FERTILIZER MARKET

...to be at least 50% manure-based organic products.



## DAIRY FIBER PRODUCTS

...surpass peat moss use in the horticulture sector.

## ENERGY INDEPENDENCE

...made a reality for 1,000 livestock farms thanks to AD biogas systems.

## WASTED FOOD

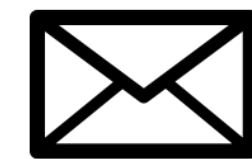
...managed (to the tune of 20M tons) in on-farm AD systems by 2030.



# CONTACT US...

## CHRIS VOELL

U.S. Environmental Protection Agency  
Global Methane Initiative



[voell.christopher@epa.gov](mailto:voell.christopher@epa.gov)



+1 202 343 9468

AgSTAR and Landfill Methane Outreach Program

[www.epa.gov/agstar](http://www.epa.gov/agstar)

[www.epa.gov/lmop](http://www.epa.gov/lmop)

Global Methane Initiative

[www.globalmethane.org](http://www.globalmethane.org)