



# PUSHING THE BOUNDARIES OF SUSTAINABILITY INNOVATION

**Presented by Gary Grimes, Director of Sustainability and Technology**



# CARBON REDUCTION IS NO LONGER A CHOICE IT'S AN OBLIGATION

## Today's Business Imperative

- 90 percent of **S&P 500** Index Companies Publish **Sustainability Reports** in **2019**
- Carbon Pledges are central components of corporate social license
- Three out of four Americans prefer shifting from fossil fuels to cleaner energy.

## State & Federal Compliance

- **California and Oregon** have Carbon Fuel Standards
- **U.S. States with Net Zero commitments by 2050:** California (2045), New York, Washington, Oregon, Massachusetts, Hawaii (2045), and Colorado

## U.S. Climate Goals

- **The U.S. has signed back on to the Paris Accords**

# SUSTAINABILITY COMMITMENTS



LOS ANGELES COUNTY  
SANITATION DISTRICTS  
*Converting Waste Into Resources*



# INNOVATIONS DRIVING CARBON REDUCTION

**Pioneers of the Biodiesel and Renewable Diesel markets**

**First refinery to commercially blend GTL (Gas To Liquid) diesel to make CARB diesel.**

**Developed and commercialized rubber modified asphalt technology that uses waste tires for highways.**

**First refinery in California to commercialize Renewable Diesel and the first in the world to commercialize Renewable Jet Fuel (Sustainable Aviation Fuel - SAF)**

**Integrated heavy oil processing unit (Coker) into synthetic crude oil manufacturing in San Joaquin Valley.**



# PARAMOUNT CALIFORNIA



**Renewable F-76 and JP-5, SAF,  
Renewable Diesel, Gasoline + Propane**



**Volume** 45 million gallons annually currently

**Acres** 66-acres (owned)

**Feedstock** Soybean Oil,  
Tallow, Lard

**Railroad** Railway access that can accommodate  
55+ cars on property

## Description

- California's only currently operating Sustainable Aviation Fuel (SAF) and Renewable Diesel (RD) refinery
- World Energy is investing to fully convert the former oil refinery in Paramount into the most advanced multi-technology low-carbon fueling hub in the world
- During the next five-years the plan is to convert the 66-acre site to produce 350 million gallons of SAF and RD
- World Energy acquired the Paramount facility in 2018



# World Energy Conversion Project

Delivering on the Low-Carbon Opportunity in California

## The World's First Low-Carbon Fuel Hub

A complete production and distribution facility



Rail Access



Storage



Pipeline Network



Highly-Accessible Truck Racks

World Energy will produce enough renewable fuel to replace 10% of California's current diesel use

## Shovel-Ready Project

\$1B project to fully convert the 66 ac complex into a 100 percent renewable fuels facility

Target completion date 2H 2023

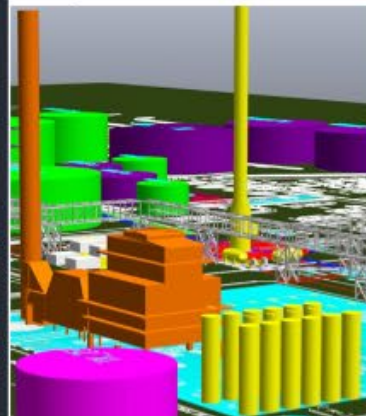


## Low-Carbon Fuels Produced + Distributed

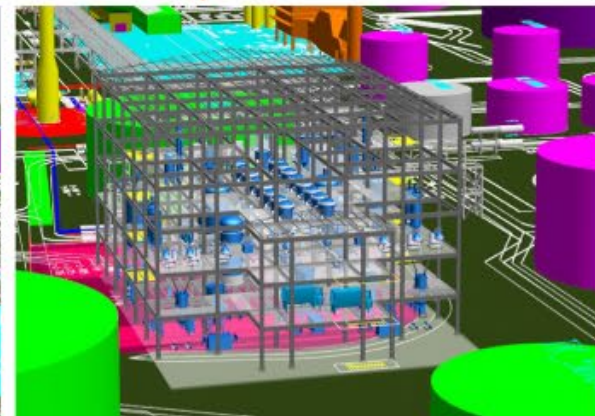
- Renewable Diesel and Biodiesel blends
- Sustainable Aviation Fuel (SAF)
- Transportation Grade Hydrogen
- Renewable Gasoline
- Renewable Propane



World Energy Conversion Project - Southern California



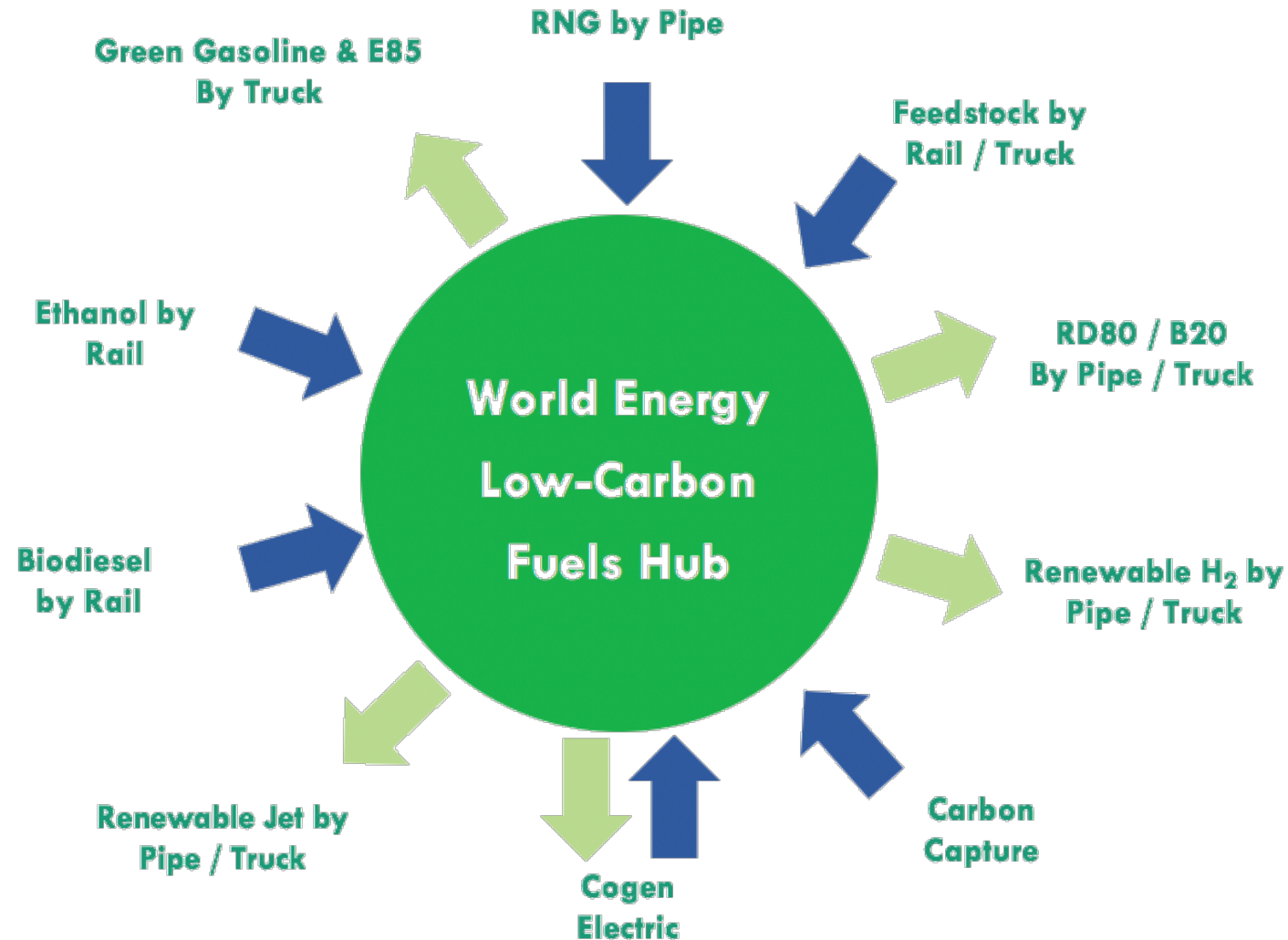
Steam Methane Reformer



Feedstock Pretreatment



# WORLD ENERGY AND YOU TOGETHER



# THE GREEN ENERGY CHALLENGE IN TRANSPORTATION

## U.S. Transportation Industry's Reliance on Fossil fuels

- Accounts for a third of the country's climate-changing emissions. In the U.S. alone, 200 billion gallons of fossil fuel are burned a year. That is ~23 million gallons an hour. The scale of the problem is massive.

## Projected Growth in the Heavy-Duty Truck Industry

- Today, diesel remains the dominant generation in long-distance transport, and feeds 97+ percent of giant Class 7-8 trucks in the United States. The new diesel trucks are so clean that it would take 60 new trucks to generate the same emissions as a single truck manufactured in 1988.

## Increasing Environmental Consciousness and Societal Pressure

- United States Climate Alliance is a bipartisan coalition of 25 governors committed to reducing greenhouse gas emissions consistent with the goals of the Paris Agreement. They represent 55 percent of the U.S. population and an \$11.7 trillion economy – an economy larger than all countries but the United States and China.

## Need An Immediate and Cost-Effective Solution

- Today, about 90 percent of medium and heavy-duty truck Original Equipment Manufacturers (OEMs) approve up to B20 and all OEMs approve up to B5. All RHD meets the same standard as ASTM D975 for Diesel fuels and is approved up to 100 percent. World Energy's low-carbon fuel solution works in today's vehicle infrastructure to provide proven solutions now.



# THE RENEWABLE PROPANE OPPORTUNITY

## **Renewable Propane – A Smaller Piece of the Bigger Problem in Transportation**

- There is a massive opportunity for Renewable Propane in the Transportation sector if the production of the fuel can get to scale
- Today, Renewable Propane is a byproduct of the refining of other renewable fuels like RD and SAF
- The right incentives and policies will encourage green energy companies to make the infrastructure changes to elevate it to a “make-on-purpose product”

# STRONG GOVERNMENT SUPPORT DRIVES INNOVATION

## CA Cap N' Trade

Today, the CA Cap N' Trade regulation does not have an exemption for renewable propane (or naphtha), which means its sale creates full fossil GHG obligations

## CA LCFS

The original LCFS program exempted propane, which means that renewable propane did not earn LCFS credits. This was recognized in the most recent 2019 amendments.

## Other Policy Possibilities

- Expand LCFS for non-transportation fuel uses
- Promote government use
- Excise tax exemption

# RD ENVIRONMENTAL BENEFITS

## Immediate + Positive Environmental Impact

- Odorless biodegradable fuel that is less harmful for drivers, handlers and the environment
- High-cetane number and low aromatic content correlate with reduced NOx & PM, potentially reducing toxic compounds
- Accepted as CARB diesel, which is required to have higher cetane and lower aromatics than the other 49 state diesel requirements.
- High-quality RD reduces

From Jan. 2016 to Dec. 2019

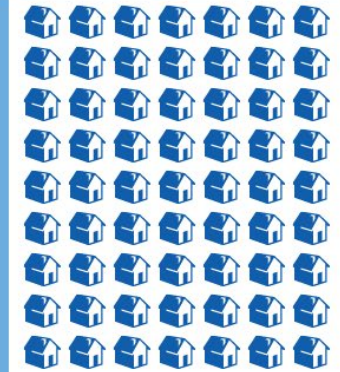
### World Energy Renewable Diesel (RD) Carbon Savings

**115,811,350  
Gallons**

Total production from  
beginning of process



Equivalent to removing  
172,994 vehicles off the  
road annually



**87,244**  
Household Emissions  
Removed

**950,447 Acres**



Equivalent of forest sequestered

**1,781,068,406 LBS**

CO2 Saved



**15.38 LBS**

MT CO2e Saved



**6,976 GMS/GAL**

CO2 Saved





# THANK YOU!

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