



# New Markets and Future End Uses for Renewable Gas

Tod Delaney, First Environment, Inc.  
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**FIRST  
ENVIRONMENT**

# Introduction



Tod Delaney, PhD, PE, BCEE  
Founder & President

- Expert witness to support litigation practice at First Environment
- Federal sector work – Small Disabled Veteran Owned Service Business
- Since 1990s leader in ISO standards on climate, GHG
- Developed inhouse sustainability, life cycle, and circular economy practice for GHG consulting for clients

# Topics of panel presentation by Tod ...

1. Role of key trade groups and coalitions to advance RNG markets – ABC, BSCE, CHBC
2. Key programs in the biogas and clean hydrogen sectors
  - a. **Carbon Accounting Methodology proposed for measuring the carbon impact of Biogas & RNG Projects**
  - b. **Hydrogen Credits (Production Tax Credits) under Inflation Reduction Act (IRA)**
  - c. **Hydrogen promotion under Infrastructure Investment & Jobs Act (IIJA)**
3. Carbon Intensity (C.I.) and CA/EPA GREET (Greenhouse gases, Regulated, Emissions, and Energy use in Technology) modeling
4. What does the future hold for RNG in North America?
5. Q&A

# The future from a verifier's standpoint

## Hydrogen, Hydrogen, Hydrogen

- Addresses transportations need for higher BTU fuels and eliminates tailpipe greenhouse gases
- Unless produced with renewables, presents a life cycle GHG question

## Increased reliance on carbon footprinting

- Needed to more fully identify and understand ghg emissions

## Radiative Forcing

- Moves beyond ghg emissions to look comprehensively at the factors that add to or decrease global warming
- New standard for projects that reduce radiative forcing not just GHGs
- Will radiative forcing footprints and inventories be next?

## Verifiers

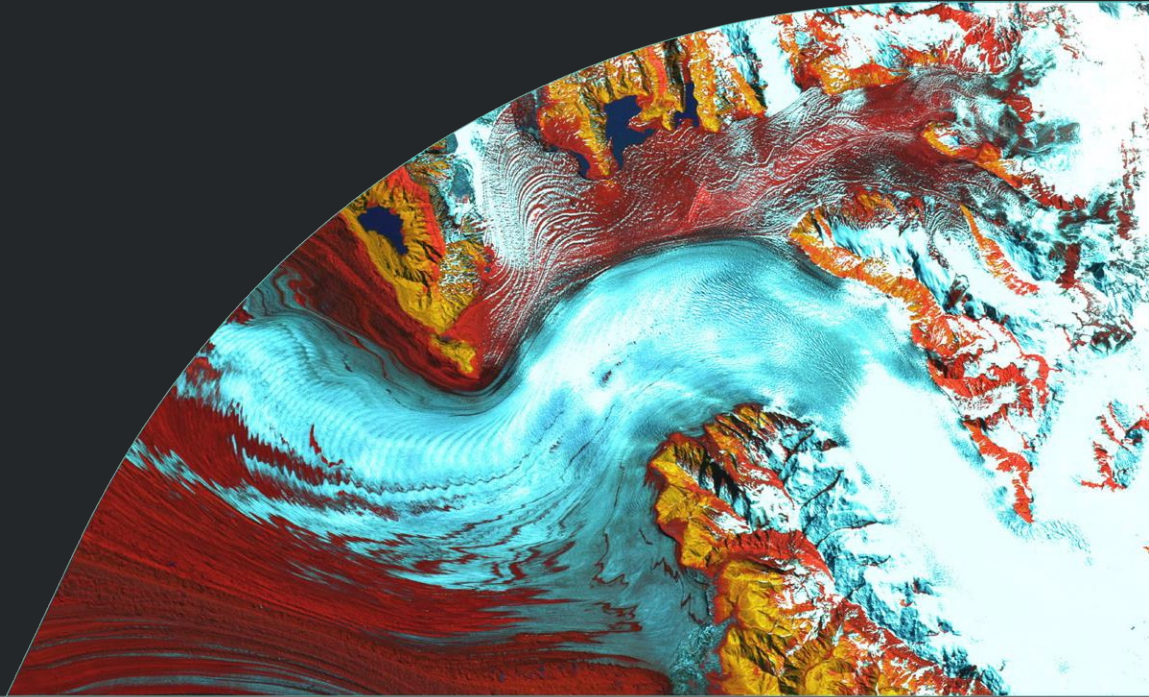
Increasing demand for third party verifiers  
Will the supply meet this demand?

# Industry Advocacy Groups promoting RNG

- **American Biogas Council (ABC)**
  - National trade association championing the growth of the biogas industry by representing, informing, connecting and training its members. Active lobbying component at state & federal level.
- **Business Council for Sustainable Energy (BCSE)**
  - National trade association that advocates for energy and environmental policies that promote markets for clean, efficient, and sustainable energy products and services. Active lobbying component at state & federal level.
- **CA Hydrogen Business Council (CHBC)**
  - Membership-based trade association comprised of over 140 companies, agencies, and individuals involved in the business of hydrogen. CHBC is the leading advocate for the hydrogen and fuel cell industry in Sacramento. Mission is to educate the public and policymakers on the substantial benefits of hydrogen and to develop and advance policy positions that support the commercialization of hydrogen in the energy and transportation sectors to achieve California's climate, air quality, and decarbonization goals.

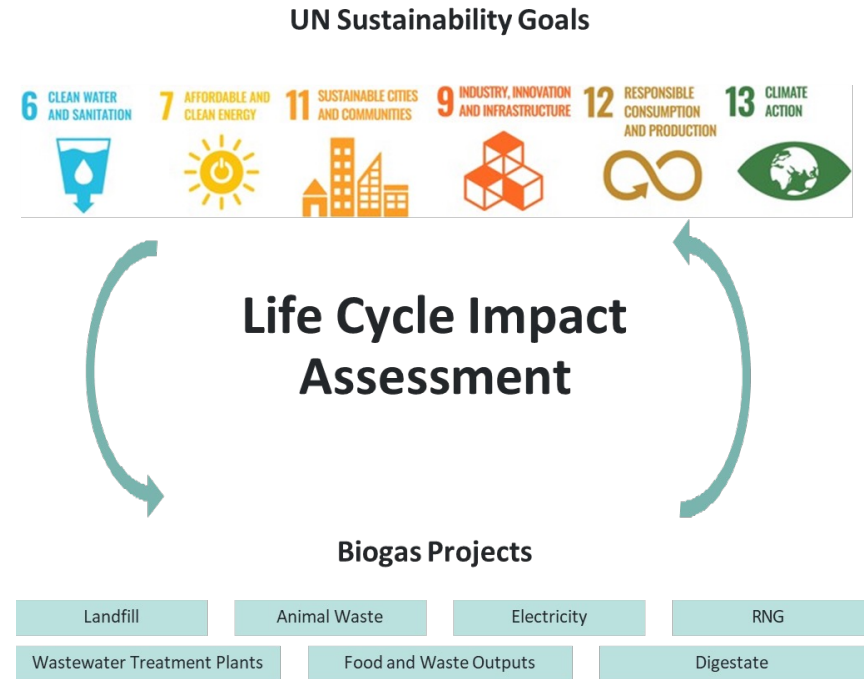
# Carbon Accounting Methodology

American Biogas Council



# ABC Proposal - Develop a Consistent Way to Measure the Impact of Biogas Projects

- ABC is developing a carbon impact of biogas & RNG project methodology based on a life cycle approach
- Creating value for your business and the planet
- This project addresses GHG emissions



# Clean Hydrogen





# Companies working in Hydrogen



FuelCell  
Energy



SKYBRIDGE  
ENERGY



# Hydrogen Credits – under IRA & IIJA

## Clean Hydrogen Production Tax Credit (PTC) - IRA

- Creates a new 10-year fully refundable tax credit for the production of clean hydrogen
- Provides for a credit of \$3.00/kg for hydrogen facilities under construction before December 31, 2032
- Can be claimed with nuclear PTC

## Infrastructure Investment & Jobs Act (IIJA)

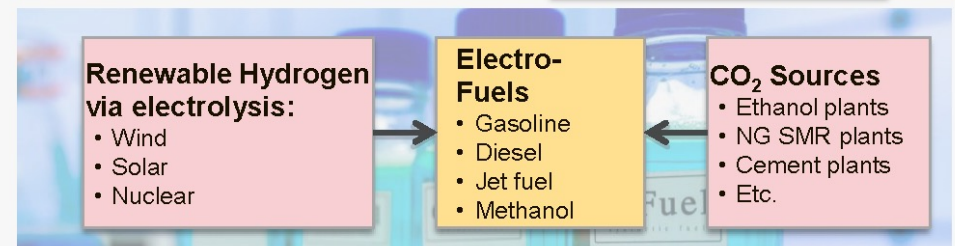
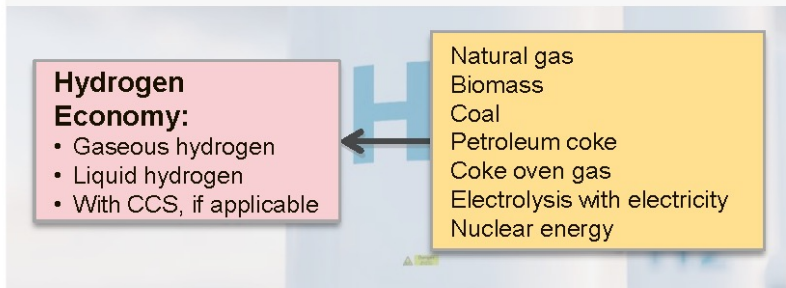
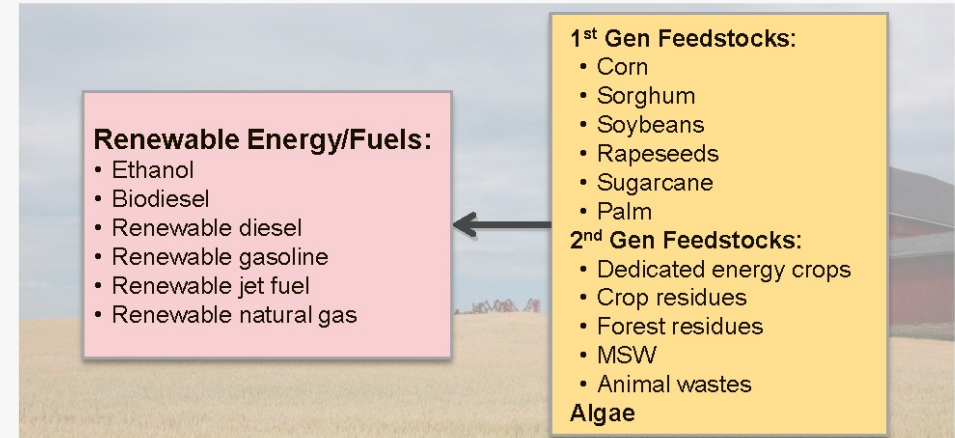
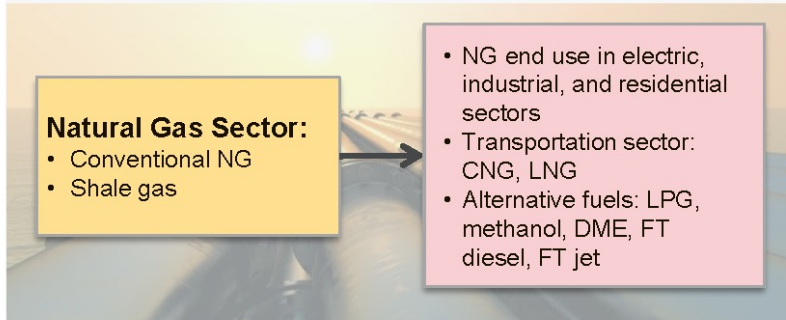
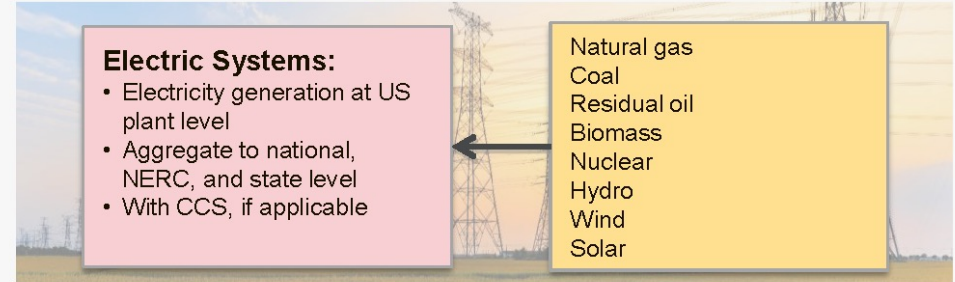
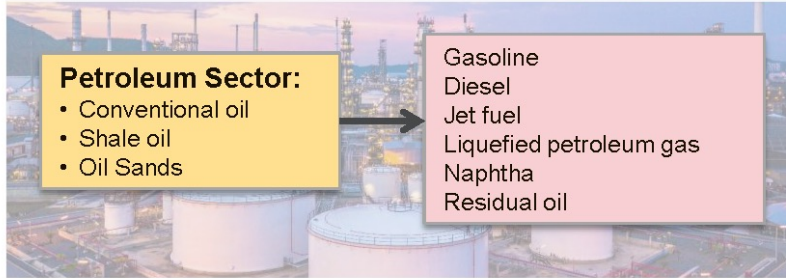
- Under IIJA, DOE should allow power purchases from both existing and new sources of carbon-free energy to be used in the verification of a hydrogen project's carbon intensity (C.I.) from grid-connected electrolyzers.
- C.I. scores are based on the CA and EPA GREET models

# GREET Model

- **G**reenhouse gases,
  - **R**egulated
  - **E**missions, and
  - **E**nergy use in
  - **T**echnology
- US Process-based LCA
  - Transportation Focused
  - Metrics
    - Energy Use
    - Air Pollutants
    - Greenhouse Gases
    - Water Consumption
  - Platforms
    - Excel
    - .Net Framework

# GREET covers many groups of energy systems

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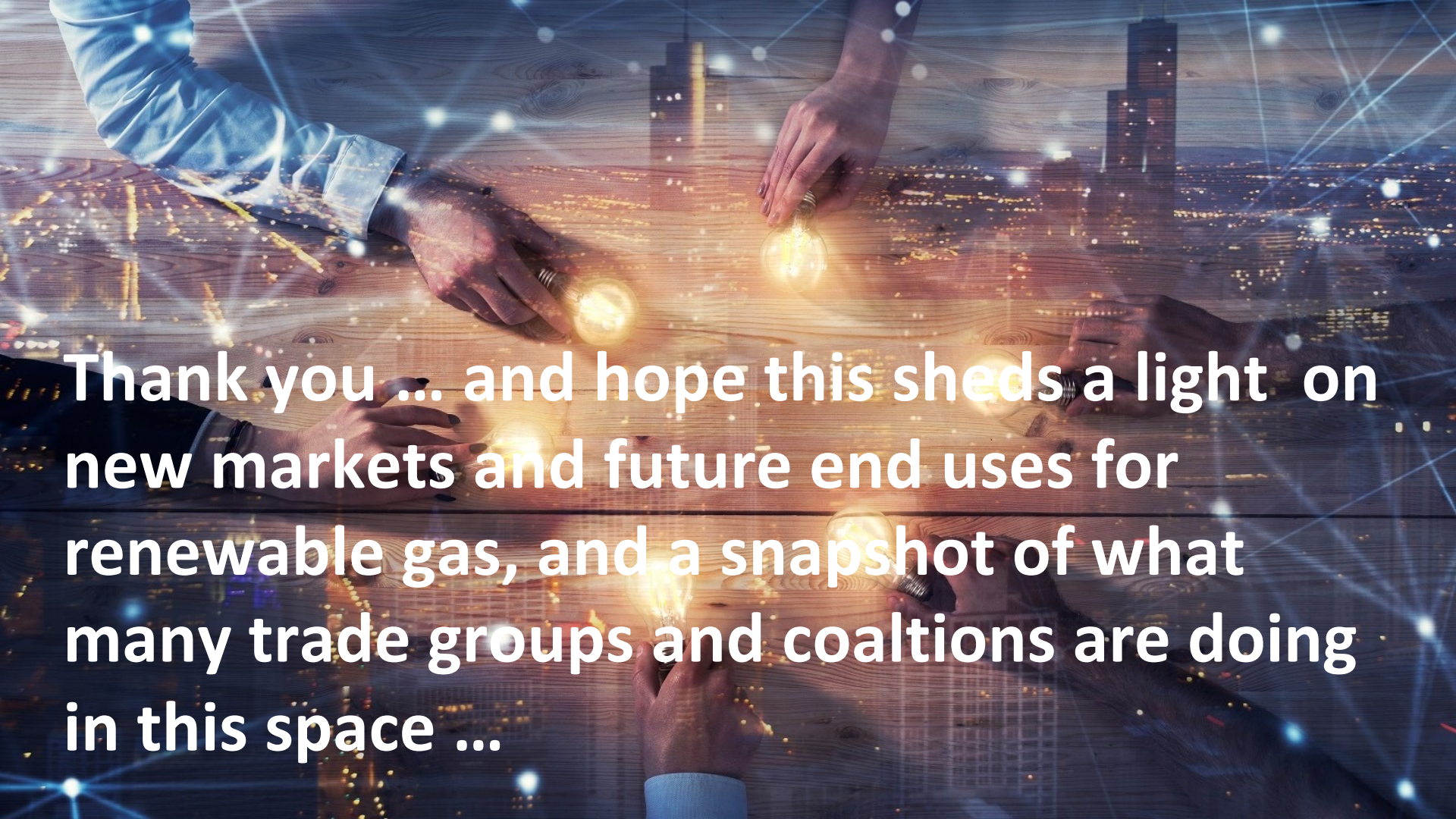
GREET also includes material production pathways

# What does the future hold for Renewable Biomass and other Sources of RNG

- MSW Landfills
- Municipal Wastewater Treatment Plants
- Agricultural Manure (Dairy/Swine)
- Separated Food Waste (Source Separated Organics)
- Separated MSW
- Agricultural & Forest Crops/Residues

# Technology Advancements & M-RETS

- Cluster Facilities
- Virtual Pipelines
- Smaller, Economical Treatment Units
- M-RETS - Thermal REC
  - RNG Thermal RECs started in Dec 2019
  - First Green Hydrogen trades started this year
  - Set-up for Renewable Electricity from biogas



**Thank you ... and hope this sheds a light on new markets and future end uses for renewable gas, and a snapshot of what many trade groups and coalitions are doing in this space ...**

# Thank you!



Any questions?

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