
State of the U.S. Renewable Fuels Markets

REM 2024

Presented by Sam Lehr

MOLECULE GROUP



About Molecule Group

- Policy firm focused on sustainable fuels, chemicals and materials
- Intersection of G7, G20, CEM, IEA, COP and practitioners
- Intergovernmental commitments, overarching policy priorities





Defining Sustainable Molecules

Feedstock:

- Biomass
- Organic waste
- CO₂
- Hydrogen

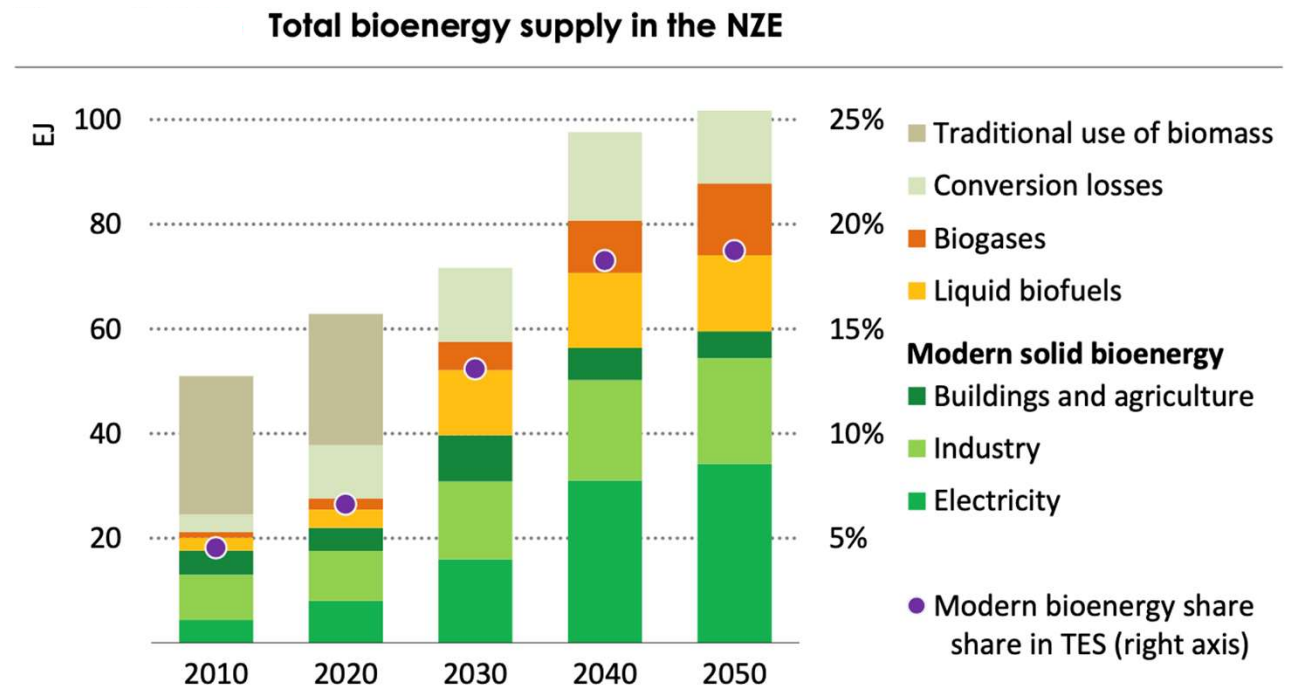
End-Use:

- Liquid fuels
- Gaseous fuels
- Chemicals
- Materials

Common Thread: Sustainability determined by combined climate and environmental impact of all interactions—feedstock, production process, end-use emissions, etc.

Big Picture: Bioenergy

- Biomethane increase 27X from 2021, 20% of total gas volume
- 50% aviation/20% marine fuel covered by policies
- Half of liquid biofuels used in aviation
- Atmospheric CO₂ removal via BECCS



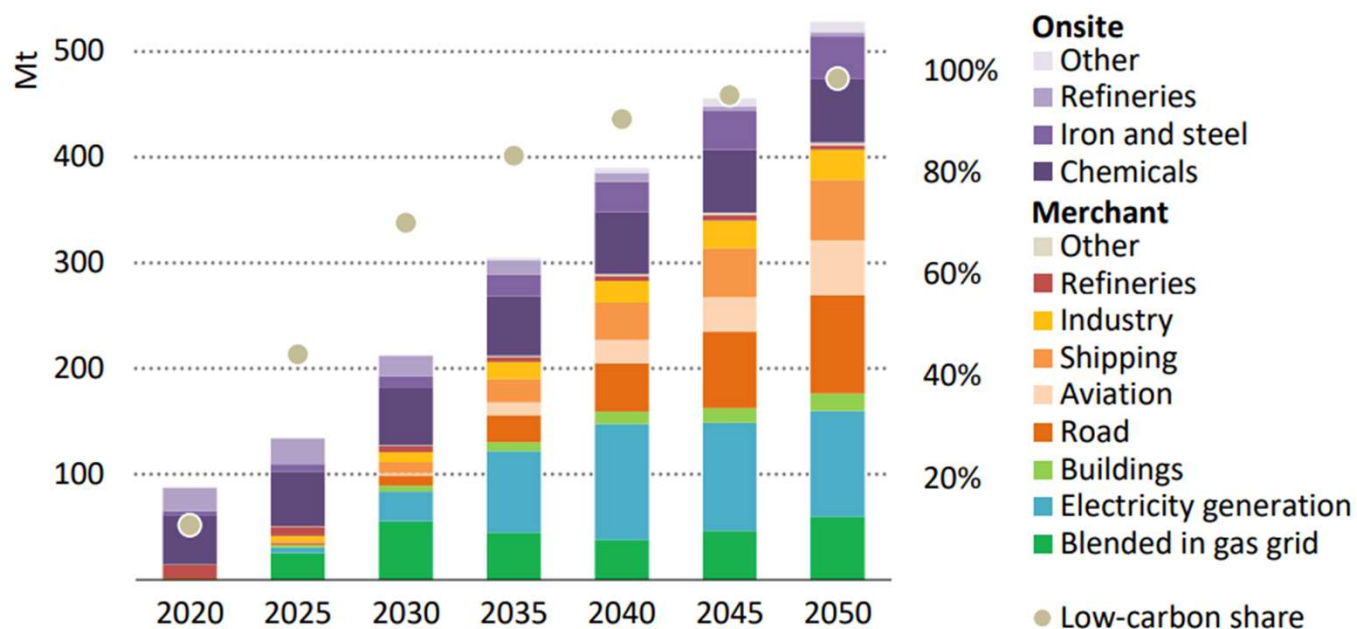
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Source: IEA Net Zero by 2050 Report

Big Picture: Hydrogen and E-Fuels

- Anticipates significant near-term increase in hydrogen end-users
- 15% blend in shared gas infrastructure
- 2% of electricity generation
- 30% of hydrogen to e-fuels

Global hydrogen and hydrogen-based fuel use in the NZE



Source: IEA Net Zero by 2050 Report

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U.S. Market-Based Policies for Renewable Fuels



Transportation Sector

- Renewable Fuel Standard
 - U.S. Environmental Protection Agency portfolio standard for biofuels in transportation sector
 - Utilizes book-and-claim for RNG pathways; will soon implement electronic tracking component
 - Low Carbon & Clean Fuel Standards
 - Active programs in California, Oregon, and Washington; forthcoming in New Mexico
 - Utilizes book-and-claim for RNG and electricity, including as a feedstock and as a fuel production input in some cases
 - Electronic tracking available for RNG in WA and OR
 - Possibility for programs to include SAF and maritime in the future
 - RNG comprised 79% of all on-road natural gas use in 2023 (97% in CA)
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Thermal Sector

- Renewable Gas Standards
 - Gas sector portfolio standards that include RNG and/or hydrogen
 - In place in California (mandatory) and Oregon (non-binding target)
 - Use M-RETS for electronic tracking
 - Clean Heat Standards
 - Thermal sector portfolio standards that include electrification, RNG, hydrogen, and others
 - Vermont slated to be first true CHS; versions exist in Minnesota and Colorado
 - Federal tax credits for hydrogen incorporate market-based instruments
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U.S. Market-Based Policies for Renewable Fuels

- Need for more policies in place, more state-level strategies that take into account full decarbonization pathways
- Alignment with European Commission becoming critical:
 - Union Database for Biofuels
 - Slated to affect RNG, CO₂, hydrogen
- How will supply and demand from other countries affect U.S. markets?
 - E.g., Brazil, Japan



Policy Priorities for Sustainable Molecules



Overarching Policy Priorities: Procurement


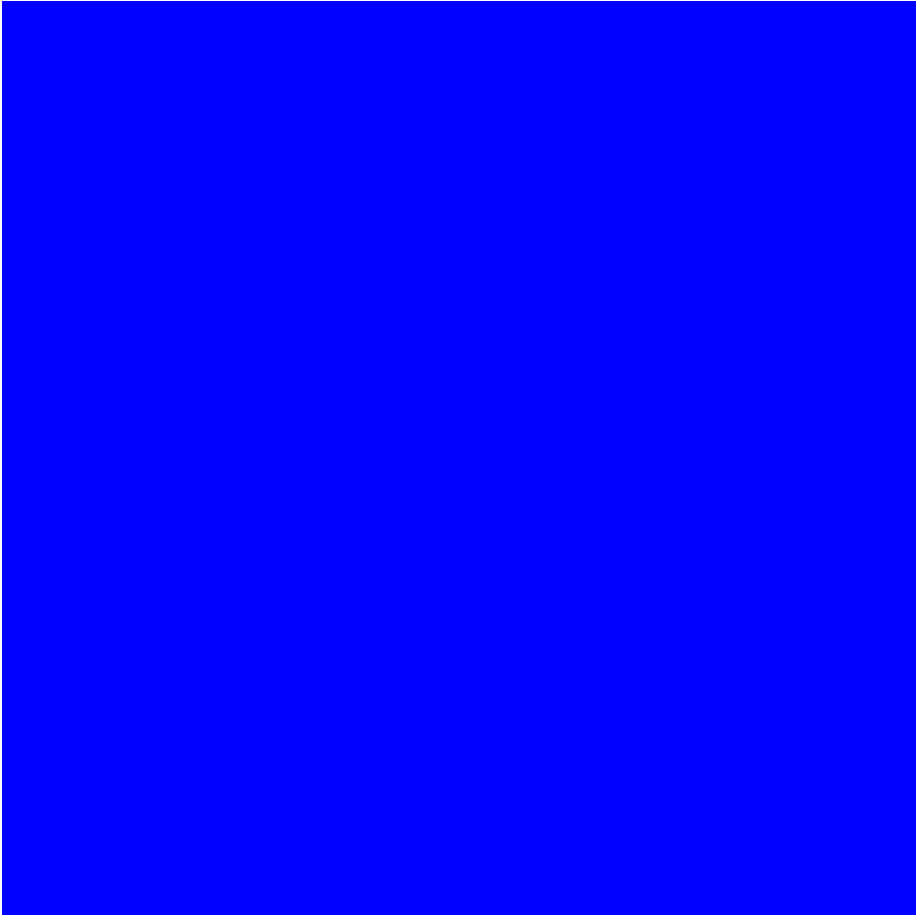
Pressure is building for alignment of accepted procurement methodologies for sustainable molecules:

- International Energy Agency, Brazil, and industry calling for action at G20
 - Entire EU gas grid and all US programs use renewable gas procured via book-and-claim/mass balance as a means of scope 1 reduction. Other countries focused on fuels (e.g., Brazil, Japan, India) are likely to use this methodology ubiquitously
 - GHG Protocol and SBTi do not specify treatment of book-and-claim/mass balance accounting for renewable gas
 - Ongoing multi-year impact on investment in RNG, will affect hydrogen and CO₂
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Overarching Policy Priorities: Carbon Accounting

- Treatment of biogenic CO₂ as carbon neutral is largely ubiquitous among standards, but often misunderstood by policymakers
 - Lifecycle carbon intensity values show differences depending on methodology, land use change has the most variation
 - Treatment of recycled carbon—positive or neutral?
 - Current EU framework treats recycled carbon fuels as neutral until 2036
 - How to prioritize bioenergy with carbon capture and sequestration, avoided emissions?
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The Forum will convene a series of roundtables at meetings of the G7, G20, Clean Energy Ministerial, and International Energy Agency through 2025:

1. Establish intergovernmental priorities for sustainable molecules
2. Pursue collective action on priority policy issues

Inaugural roundtable to be held at CEM 15 on October 3, 2024.



Sam Lehr

EVP of Policy

Molecule Group

slehr@molecule-group.com
