

March 24, 2025

California Air Resources Board
1001 I Street
Sacramento, CA 95814

Subject: Public Comment on Natural Hydrogen for CARB's SB 1075 Hydrogen Market Development Strategy

Dear California Air Resources Board Staff,

Golden Element Energy appreciates the opportunity to provide comments as part of CARB's efforts under SB 1075 to develop a hydrogen market strategy that advances California's ambitious decarbonization goals. Through extensive research and the application of advanced data analytics, Golden Element Energy is in the early phases of working to enable large-scale, hydrogen production in California that can play a key role fueling the clean California economy of the future. As CARB develops its SB 1075, we encourage the agency to consider the benefits of natural hydrogen in California's hydrogen production strategy.

About Natural Hydrogen and Its Potential

Natural hydrogen is a naturally occurring gas produced through geochemical water-rock reactions within the Earth's subsurface. Until recently, conventional wisdom held that hydrogen molecules were too small to accumulate in significant quantities underground. However, advancements in geoscience have proven otherwise, revealing that hydrogen can accumulate in natural reservoirs and be accessed safely and efficiently using well-established drilling techniques.

Natural hydrogen boasts great potential as clean energy source of the future:

- **Minimal Land Footprint:** Natural hydrogen production utilizes less than 10 acres of land per site, making it highly efficient and environmentally sustainable.
- **24/7 Dispatchable Energy:** Natural hydrogen provides reliable, baseload hydrogen production that can complement intermittent renewable energy sources.
- **Scalability and Cost-Effectiveness:** Natural hydrogen can be produced at scale with low-cost extraction methods, offering a cost-competitive solution for decarbonizing multiple sectors.

The Role of Natural Hydrogen in California's Decarbonization Strategy

Natural hydrogen can play a critical role in helping California meet its climate and energy goals by decarbonizing hard-to-abate sectors, including:

- **Industrial Applications:** Natural hydrogen can provide clean process heat for steel, cement, and chemical production, where electrification is not viable.
- **Transportation:** Hydrogen-powered fuel cells can decarbonize heavy-duty trucking, maritime shipping, and aviation.
- **Power Generation:** Natural hydrogen can fuel turbines or boilers at power plants, cutting emissions while maintaining grid reliability.
- **Synthetic Fuels:** Hydrogen is a critical feedstock for producing synthetic fuels, which are essential for decarbonizing industries that rely on liquid fuels.


California's hydrogen economy is expected to grow significantly. According to the U.S. Department of Energy (DOE) Hydrogen Shot Initiative, the hydrogen industry could reduce domestic CO₂ emissions by 16% by 2050 and generate over 700,000 high-quality jobs across America by 2030 to support the growing hydrogen market.¹ Furthermore, McKinsey & Company estimates that the global hydrogen market, which reached approximately 87 million tons per annum (Mtpa) in 2020, could grow to as much as 580 Mtpa by 2050.² As part of this transition, natural hydrogen can provide a scalable, low-cost supply that enhances energy security while supporting economic growth.

Conclusion

Natural hydrogen represents a transformative opportunity for California. Its ability to deliver zero-emission hydrogen at scale, with minimal land and water impacts, positions it as an ideal complement to the state's renewable energy goals. Additionally, by leveraging existing infrastructure and workforce expertise, natural hydrogen can accelerate California's transition to a clean energy economy while providing equitable economic benefits to historically underserved communities.

As CARB develops its hydrogen market strategy under SB 1075, we urge the Board to recognize the transformative potential of natural hydrogen. By leveraging this zero-emission, low-cost energy resource, California can achieve its decarbonization targets while fostering economic growth and supporting workforce transitions. Golden Element Energy looks forward to collaborating with CARB and other stakeholders to ensure that natural hydrogen becomes a vital component of California's clean energy future.

Thank you for your consideration.

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 Kyle B. Handy
 Sr. Regional Landman
 Golden Element Energy

¹ U.S. Department of Energy. *Hydrogen Shot Initiative: An Introduction to Hydrogen and Its Role in the Clean Energy Transition*. 2022.

² McKinsey & Company. *Hydrogen Insights: A Perspective on Hydrogen Investment, Market Development, and Cost Competitiveness*. 2021