

# SAVUSOL™

Clean hydrogen  
production  
standard

Feedback to  
draft guidance

# Cover page

## 1 Basic information

### 1.1 Organization name: Zanzabar LLC, DBA Savusol

Savusol is pronounced save-us-all

DUNS: 030861609

TAXPAYER ID: 83-1495890

### 1.2

### 1.3 Submission date: November 2, 2022

### 1.4 Type of business: LLC, small business& socially disadvantaged ( Mr. Lowry has a permanent disability)

### 1.5 Contacts

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### 1.6 Signature

scott lowry                      11/10/2022

Scott Lowry

Date

### 1.7 Other agencies

No other government entities or private organizations have received copies of this feedback .

### 1.8 External review

This document may be subject to external review and does not contain any proprietary information not already protected by patent.

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## 2 Introduction

the clean energy industry and the DOE in particular appears to be operating under several false assumptions.

- 1) Reducing carbon emissions is the way to meet the world's climate goals  
*Emission reduction is a critical component to meeting the worlds climate goals. However, the industrial revolution has already released over 2,3 trillion tonnes of carbon dioxide into the atmosphere Emissions reduction does nothing to clean up the mess that already exists. to remove prior carbon emissions, carbon capture must be given a higher priority and greater funding.*
2. Captured carbon should be stored out of reach

Many view carbon capture and storage as some type of carbon panacea. It came from the ground so

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scott lowry

let's put it back in the ground. it seems simple enough and the layman can understand the concept. But there many problems that are not well known to the public. First. Co2 is a valuable resource that can be sold for reuse. Injecting co2 into storage diverts a potential revenue stream. Second, these storage methods are not immune from leakage and even a small leak can release a quantity of co2 that has taken much effort and expense to capture, Savusol believes reuse provides a better long term economic proposition the department of energy bioenergy technologies office website recognizes co2 utilization as a carbon feedstock for renewable fuels and high value products yet the doe continues to fund CCS and other more mainstream renewable technologies when those technologies do not address the 2.3 million tonnes of human produced CO2 already in the atmosphere.

3. Carbon capture is not economical  
 The bulletin of the atomic scientists September 2022 edition documents the long history of carbon capture failures. It is our assertion that these projects failed largely due to mis-aligned goals and/or counter motivations.

At the DOE, the hydrogen with carbon management program invests in research, development, and demonstration to evaluate carbon-based clean hydrogen (i.e., coupled to carbon capture and storage) as a fuel and support development of technologies to use clean hydrogen from any source. the division's efforts are an integral part of the department of energy's recently launched hydrogen shot, with a goal of clean hydrogen costs of \$1/kg within one decade (1-1-1) while expanding employment of the us energy workforce. seeking a cost-

competitive decarbonized alternative to traditional fossil fuels, the program has a research and development portfolio consisting of a new generation of carbon neutral or net-negative greenhouse gas emissions technologies. gasification, reversible solid oxide fuel cells, technologies in hydrogen turbines, and advanced materials, sensors and controls all support this goal. The Integrated Carbon Management Program invests in research, development, and demonstration efforts that are integral to Fossil Energy and Carbon Management. It focuses on integrating energy storage technologies with new and existing power plants to help attain net-zero emissions in the power sector by 2035.

Those words on the DOE website acknowledges the value of carbon reuse and the bipartisan infrastructure law directed \$10 billion for carbon management reuse however the DOE has not turned those words into actions by funding the development of U.S11002255 which reuses captured carbon as a carrier of geothermal energy in the form of ethanol while also producing green hydrogen, ammonia and other green fuels.

The time for talk and half measures is behind us. The world needs aggressive actions on innovative projects with high standards if we are to stop a global crisis. A tiered CHPS rewarding the cleanest of the clean is only a start down that path.

4. Activities such as carbon capture or hydrogen production require some amount of carbon producing energy. And or carbon-based feedstock. Even concerns about emissions from upstream and downstream processes are mitigated in a circular carbon economy where geothermal energy produces ethanol from captured co2. A in a mature circular carbon economy, even the methods of fuel transportation are using fuel produced from captured co2 eliminating the upstream and downstream emissions from vehicles, pumps, motors, compressors and other equipment.

The department of energy website identifies three methods of hydrogen production: fossil resources, Biomass. Waste and H2O splitting. It goes on to identify hydrogen production processes as thermochemical, electrolytic direct solar water splitting. And biological. It is our observation that projects have a history of mis pairing the feedstock and the methods or energy sources. By properly pairing a carbon free method of production such as electrolysis with carbon free processes and energy sources such as geothermal it is possible to produce hydrogen or capture carbon with almost zero and f secondary emissions. This pairing is certainly far below the 2KG of carbon dioxide equivalent produced at the site of production as Set forth in the draft CHPS.

The economics of this pairing is also ideal. While geothermal energy has a higher startup cost than most energy production methods, its operational costs and risks are extremely low. making it feasible to build utility scale geothermal plants dedicated to the production of clean fuels a major limiting factor of geothermal energy has been is dependence on location.by dedicating plants to clean fuel production, their location becomes less relevant. Hydrogen or other clean fuels can be easily transported to places of demand.

5. Offshore geothermal energy is not of programmatic interest.

On August 13th, 2022, Savusol was notified by the department of energy unsolicited proposal office that their proposal A-2022-38) to study offshore locations for potential geothermal energy plants was “not of programmatic interest” this is a misguided allocation of resources. The production of clean fuels using offshore geothermal energy unlocks unlimited clean fuel potential powering the growth of the world's economy for decades into the future. It is the production of fuels from geothermal energy both on shore and offshore that will allow the human species to become a type I species and develop Kardashev type II technologies.

6. Alternative energy sources such as solar and wind including Electric vehicles and equipment are how the world will mitigate transportation emissions

- 1) While the world has invested billions of dollars in reducing emissions from the easiest to mitigate sectors, the hard to abate sectors of the economy such as energy intensive industries, commercial aircraft and military equipment are largely going ignored, this is the result of a short-sighted capitalist economic model focused on problems that can produce the most revenue in the shortest amount of time. There is easy money in fixing addressing the low hanging fruit. What this fails to recognize is that the capital-intensive solutions that will eventually solve the hard to abate industries can also be applied to the easy to abate industries and as these technologies mature much of the clean energy infrastructure being built today will no longer be needed. As the saying goes: we are being penny wise but pound foolish. A circular carbon economy is a hard task requiring billions of dollars just to get started but in the long term is much cheaper than the wasteful, disposable path we are taking. the electric car is a fad. Once ethanol made from CO<sub>2</sub> captured using geothermal energy is widely available the existing gasoline infrastructure will spring back to life and the electric vehicle will fade into history as a waste of time and money remaining as a niche for car collectors, historians and museums.

## 2.1 Summary

Savusol believes an initial production standard of 4.0Kg CO<sub>2e</sub>/KgH<sub>2</sub> will lead to further mismatches of feedstock, processes and further incentivize CCS INSTEAD OF CCU. A tiered standard consisting of blue, green and grey may be more beneficial where grey is the proposed standard of 4.0Kg CO<sub>2e</sub>/KgH<sub>2</sub>, blue at 3.0Kg CO<sub>2e</sub>/KgH<sub>2</sub> and green at 2.0Kg CO<sub>2e</sub>/KgH<sub>2</sub>. these tiers should be regulatory standards as well as guidance. as regulatory standards, all government proposal evaluations should favor both hydrogen producers and consumers using the cleaner tiers of hydrogen over other proposals (assuming all else being equal.) other solicitations and awards should go to innovative projects with the goal of producing hydrogen cleaner than the green tier or reusing whatever CO<sub>2</sub> may be emitted. The conflicting DE goal of \$1 per kilogram of hydrogen may cause some to resist a higher standard than 4.0Kg CO<sub>2e</sub>/KgH<sub>2</sub> however we believe the difference in costs from one standard to the next can be accommodated with tighter profit margins and reasonable executive pay. Those companies truly working toward the production of clean hydrogen can meet both goals.

DOE and other government awards and credits would favor green and blue producers over grey hydrogen producers. This would not eliminate the production of grey and blue hydrogen but would incent hydrogen producers to optimize all facets of their supply chain, production methods and feedstock. With a goal of producing green hydrogen and reusing CO2 emissions.

# Bibliography

2.2 [Bulletin of atomic scientists](#)