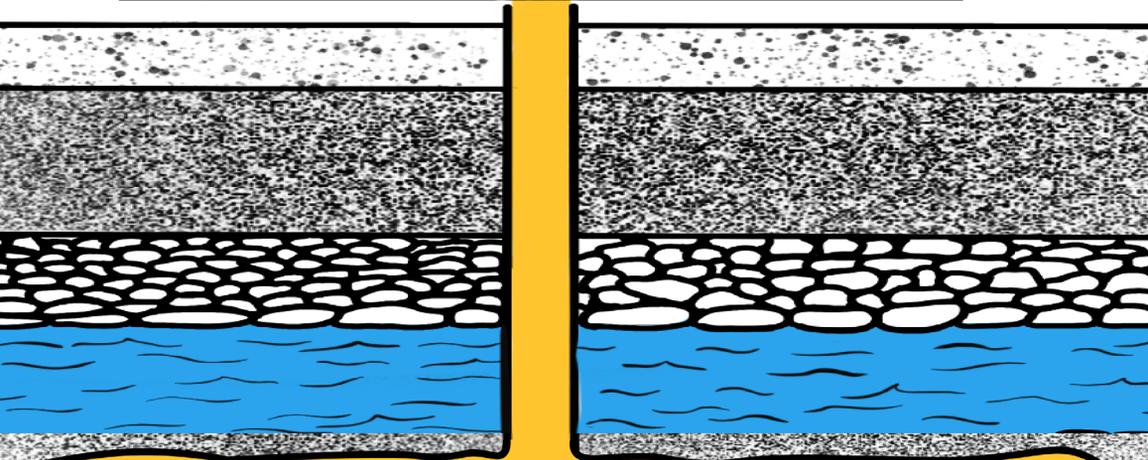
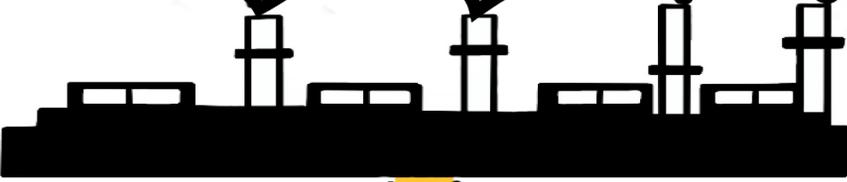


Don't Believe
the

HYDROGEN



HYPE

A Zine on Why Hydrogen Energy Production is a False Solution

*Created By:
Pueblo Action Alliance and NM No False Solutions Coalition*

WHAT ARE FALSE SOLUTIONS?



IMAGE DESCRIPTION: Members of the NM No False Solutions Coalition are pictured sitting in at the NM Governors Office in protest of inequitable climate change initiatives.

“False solutions” or “greenwashed solutions,” are climate scams that protect the fossil fuel economy and continue to place a dollar value on nature which distracts us from taking bold climate action and phasing out fossil fuels.

Global grassroots movements have created a “No False Solutions” narrative to bring light to impacts of global capitalism, commodification, resource extraction, labor exploitation and neoliberalism.

“We have continued to stand firm against all false solutions or greenwashed solutions for climate mitigation. Net zero does not mean real zero and our bottom line is no more fossil fuel extraction. Our organization stands with frontline and Indigenous communities who are directly impacted by the climate crisis perpetuated by the global fossil fuel economy.”

- Pueblo Action Alliance

WHAT IS HYDROGEN?

Hydrogen (H_2), is the lightest element in the universe but does not exist independently and is combined with other elements like water (H_2O). As a fuel and energy carrier, it is extracted through different processes and inputs including biomass, water, natural gas, nuclear energy and renewable energy. Hydrogen can be used in industrial production processes or in fuel cells to generate electricity or heat. Hydrogen can be produced using various forms of energy which are often described by different shades or colors. The United States and other developed countries are looking to create a new global energy economy for hydrogen production.

Grassroots Climate Justice movements are against hydrogen energy production, transportation and storage because it continues the use of fossil fuels and is a very dangerous fuel to store.



IMAGE DESCRIPTION: Pueblo Action Alliance and member groups from Grassroots Global Justice Alliance and Climate Justice Alliance are pictured with fists raised in protest of false solutions at the Convening Of Parties (COP 27) in EGYPT, 2023.

COLORS OF HYDROGEN

GRAY HYDROGEN

Gray hydrogen is produced from methane (CH_4), one of the most potent Greenhouse Gases (GHG). The process, known as steam methane reforming (SMR), uses steam to split the methane molecules to extract the hydrogen molecules. This process emits carbon dioxide (CO_2) which is not captured in the process. CCS needs more testing and development on a large scale to capture the emissions from power plants and has not shown to effectively store carbon dioxide.

BLUE HYDROGEN

Uses the same SMR process except it is considered a lower intensity fuel because the production is coupled with Carbon Capture and Storage (CCS), which uses technology to physically capture the carbon dioxide byproduct to then store and transport to a sequestration site or in some cases inject liquified carbon back into the ground.

Chevron, an American multinational oil and gas company, was given a target by the Australian government to capture and store at least 80% of the CO_2 released at its Gorgon LNG project through CCS technology. But the company fell short of the target by 5.23 Megatons and so they would buy the equivalent amount in carbon credits. Environmental campaigners said the shortfall in emissions reductions at Gorgon showed CCS should not be relied on as justification for allowing fossil fuel production to increase.



COLORS OF HYDROGEN

GREEN HYDROGEN

Green hydrogen uses electrolysis to split water (H₂O) to produce hydrogen. This process can be powered by renewable energy sources like wind and solar. Green hydrogen has fewer GHG emissions with the exception of nitrous oxide (NO_x) resulting from the process, but requires large amounts of water which is of concern in the arid Southwest.

PINK HYDROGEN

Pink hydrogen uses electrolysis to split up water molecules using nuclear energy. Nuclear energy has historically been a point of contention here in the Southwest because of the historic legacy of uranium mining. Opponents of nuclear energy argue that the entire footprint of nuclear energy development must include uranium extraction, fuel development, transport, and waste storage. Nuclear energy requires fossil fuels to process and transport the uranium, and it emits carbon and other pollution, as well as heat, therefore, it is not carbon-free or carbon-neutral.

No matter the color of hydrogen, there is no denying the fact that energy produced from hydrogen production is inherently harmful to our communities and it will always be a harmfully extractive industry. We will always be a "sacrifice zone" under a hydrogen economy.

Hydrogen will NEVER be clean!



HIGHLY COMBUSTIBLE!

Hydrogen is prone to material damages which can lead to leakage; High-pressure leakage is prone to spontaneous combustion with the potential for serious casualties and property damage! Hydrogen molecules are prone to react with metals that cause failures to hydrogen pipelines and steel storage vessels.

Here are 3 major types of hydrogen-induced transportation and storage failure...



Hydrogen Embrittlement (HE):

This is the riskiest failure that causes the most serious possible harm. Hydrogen Embrittlement of pipelines and storage vessel is where hydrogen forms solid solutions with the pipeline metal or metal additives. It weakens the bonding force of metal grain boundaries which results in brittle fractures or microscopic cracking/pitting. In engineering applications, the state of hydrogen in different pipelines varies, and the various interactions with metals are also different; thus, the mechanisms triggering hydrogen embrittlement are also quite different, and the corresponding prediction and prevention methods need to be studied specifically.

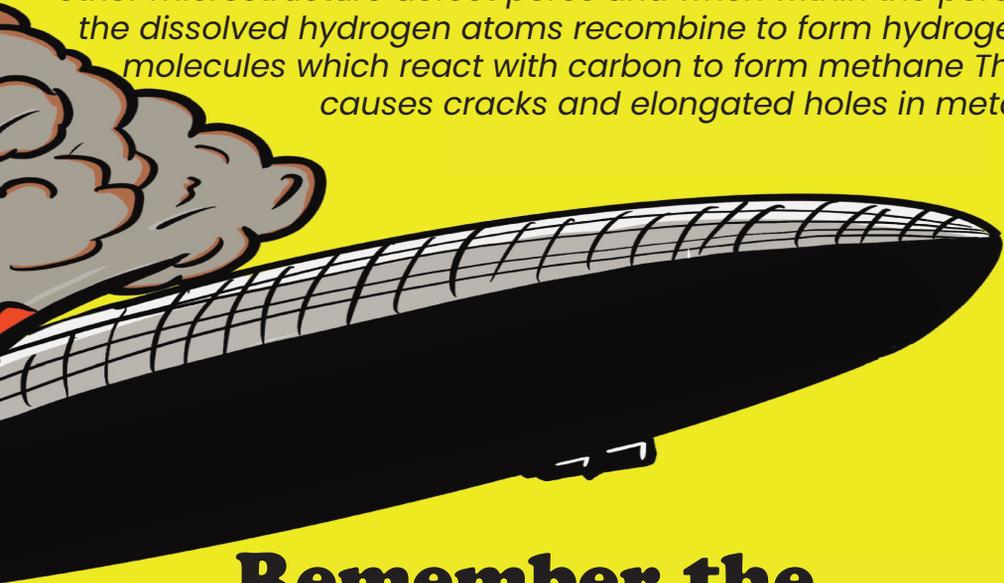
Hydrogen-Induced Cracking (HIC):

Stress Corrosion Cracking (SCC) which causes pipeline failure. Some scholars call the combination of hydrogen-induced cracking and stress corrosion cracking hydrogen-assisted stress corrosion cracking.

High-Temperature Hydrogen Attack (HTHA):

When the temperature exceeds 200C, metal contacts the hydrogen source under high pressure and high temperature, and hydrogen molecules or hydrogen atoms enter the metal.

When hydrogen is dissolved into metal it becomes highly mobile and accumulates at the grain boundaries, inclusions or other microstructure defect pores and when within the pores, the dissolved hydrogen atoms recombine to form hydrogen molecules which react with carbon to form methane This causes cracks and elongated holes in metal.



Remember the Hindenburg Disaster?

In 1937, a German aircraft burst into flames because of an electric spark that ignited the hydrogen inside the airship. The hydrogen ignited so quickly that it did not allow for reaction from bystanders and passengers on the airship. Because of this, 35 people were killed in the explosion with dozens more critically injured.

We do not need to repeat history.

HYDROGEN IN NEW MEXICO

The state of New Mexico with Governor Michelle Lujan Grisham's administration are in coalition with other states who have adopted the Paris Climate Agreement on a state level; this bipartisan coalition is the US Climate Alliance.

In 2019, Gov. Lujan Grisham released an Executive Order (EO) on Addressing Climate Change and Energy Waste Prevention.

This EO, which orders the, "adoption of a comprehensive market-based program that sets emission limits to reduce carbon dioxide, and other greenhouse pollution across New Mexico" is in alignment with the Paris Climate Agreement.

During the 2022 NM State Legislature, the governor had introduced House Bill 4, the Hydrogen Hub Act, to codify into state law the use of federal dollars and state resources to develop regional hydrogen hubs in New Mexico as a way to transition from fossil fuels.

Despite firm opposition from local NM-based Indigenous and environmental groups Gov. Lujan Grisham, behind closed doors, signed the Western Inter-state Memorandum of Understanding (MOU) with Colorado, Utah, and Wyoming to secure and share hydrogen funding to build out the Western Inter-State Hydrogen Hub (WISHH), a regional super hydrogen hub.

A THREAT TO OUR FUTURES

Hydrogen has been a historically controversial energy supplement. Instead of investing in REAL solutions to the climate crisis, our elected officials have opted to invest in FALSE SOLUTIONS for climate mitigation. Regardless of the color of hydrogen, it's production process will be resource intensive. The colors of hydrogen matter to determine whether water, fossil fuels, biomass, coal or nuclear energy is utilized, hydrogen will crutch extractive economies in New Mexico and continue to bring harm to communities. Indigenous people, youth, frontline and grassroots have advocated to end fossil fuel in the Greater Chaco landscape and Permian Basin and collectively stand against hydrogen as well!



IMAGE DESCRIPTION: A member of the NM No False Solutions coalition is pictured at a rally outside NM capitol roundhouse. A banner is behind them that is comprised of several Hydra monster heads with the words "No False Solutions", "Carbon Capture", and "Nuclear" in eerie context.

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Biomass – A term for materials that can be combusted for energy that includes everything from trash to trees, construction and demolition wood waste, black liquor (toxic paper mill goo), grasses, crop wastes, poultry waste and more – but usually involves burning trees in power plants or burning lumber, and paper mill and sawmill wastes to heat these mills.

Commodification – To place a dollar value on natural resources like land, water, fossil fuels and minerals and place those resources in a market based system.

Carbon capture and storage/sequestration (CCS) – Carbon dioxide is collected from industrial smokestacks, compressed into a liquid and transported by pipeline to a site where it can be pumped underground into oil or gas reservoirs, into saline aquifers or beneath the ocean. There is no guarantee the carbon dioxide will remain underground.

Fuel Cells – A device used to make electricity from hydrogen that utilizes a catalyst to speed up a chemical reaction between hydrogen and oxygen to make electricity, heat and water.

Global capitalism – A global economic system that depends on the extraction of natural resources and the exploitation of labor to benefit the rich and keep the poor poor.

Greenwashed Solutions – When a company spends more money, and resources, and time claiming to be “green” or eco-friendly through advertising and marketing practices and campaigns as opposed to implementing business practices that would actually minimize, or mitigate environmental impact.

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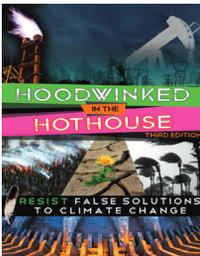
Labor exploitation – When labor that is used to fuel global capitalism usually in poor conditions, low wages and threats to human health.

Market-mechanisms – Climate mitigation and adaptation strategies that exist in global finance and carbon trading schemes.

Neoliberalism – A political economic system that relies on capitalism, free trade, deregulation of markets, and globalization, that privatizes land and means of production on land.

Net zero – Utilizing carbon offsetting schemes and carbon trading mechanisms to reach make-believe emission reduction targets that allow companies to report GHG reductions but continue polluting at the source.

Resource extraction – When natural resources are extracted at rates that cause irreparable damage to natural ecosystems.



Hoodwinked in the Hothouse

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WEBSITE: climatefalsesolutions.org/#



No False Solutions Coalition

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