DECARBONIZING GLOBAL INDUSTRY & TRANSPORT

GREENER THAN GREEN C-nH2

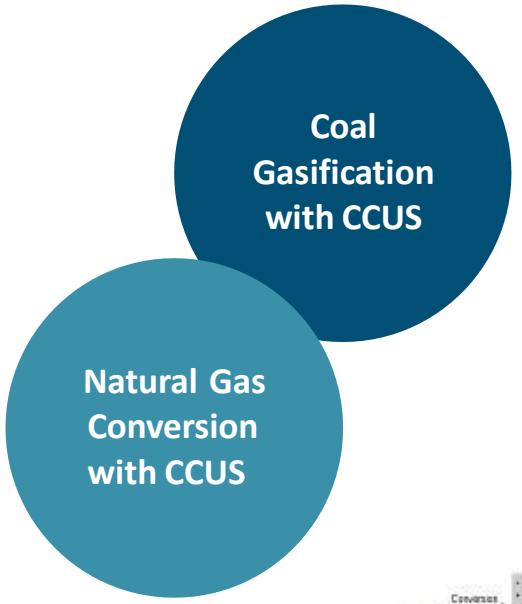
The global clean hydrogen demand cannot be met with electrolysis alone.
Experts from public and private sectors agree that other alternatives are needed.

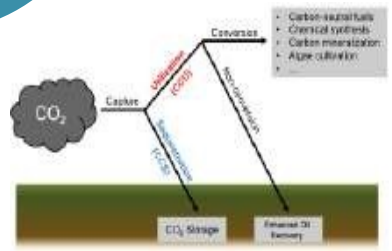
- Affordable, mass-produced, green hydrogen is the missing link required to decarbonize the world. It holds significant power and potential to address the challenge of reducing carbon emissions in hard-to-abate sectors such as heavy transport, shipping, steel, cement, and even in reducing the reliance on natural gas in our global economy. By leveraging green hydrogen, we can effectively remove or reduce carbon emissions in these sectors, paving the way for a more sustainable and environmentally friendly future. Not all hydrogen is equal.
- 98% of the world's hydrogen is currently produced using coal (brown hydrogen) or natural gas (grey hydrogen)

THE CHALLENGE: SCALING CLEAN, GREEN HYDROGEN

FOSSIL RESOURCES

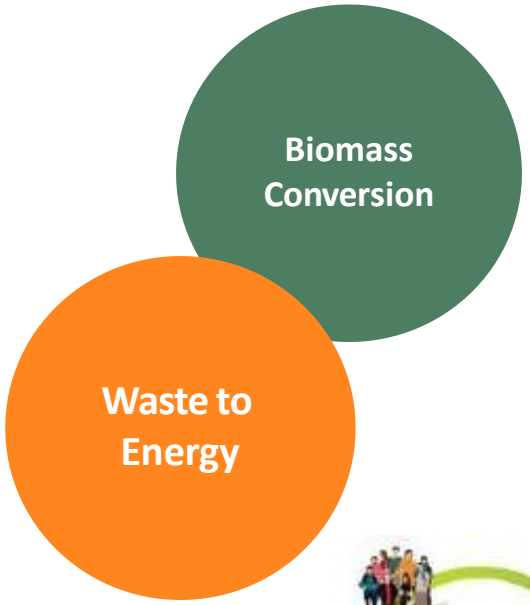
- Low-cost large-scale hydrogen production with CCUS
- New options include byproducts production such as solid carbon
  - ❖ Expensive; Not carbon free.





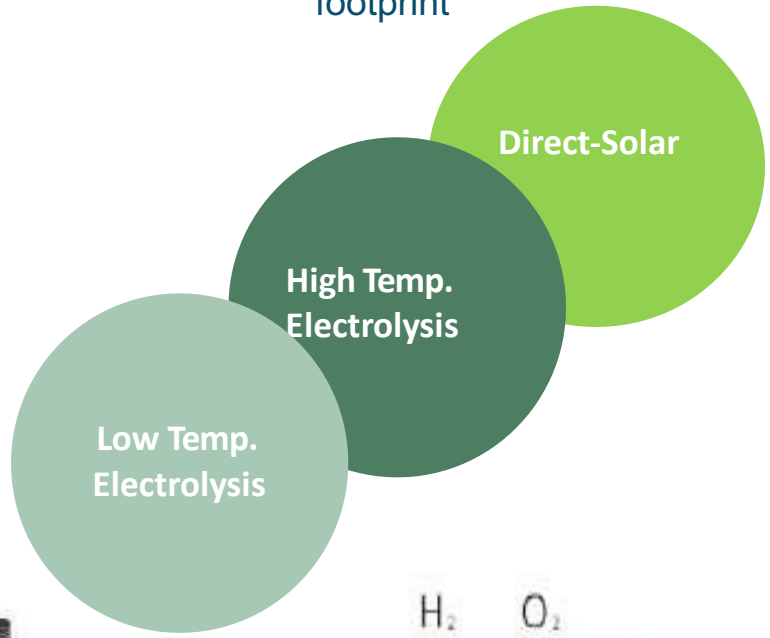
BIOMASS/WASTE

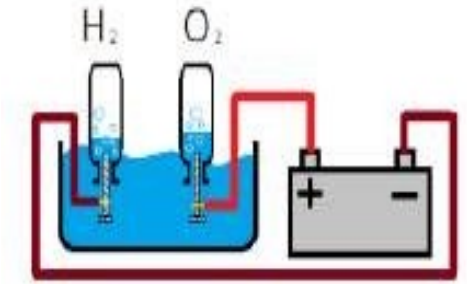
- Options includes biogas reforming & fermentation of waste streams
- By-product benefits include clean water, electricity and chemicals
  - ❖ All except SGH2: Toxic byproducts; Not carbon free



WATER SPLITTING

- Electrolysers can be grid tied, or directly coupled with renewables
- New direct water splitting options offer long-term sustainable hydrogen
  - ❖ Expensive; Large land and water footprint



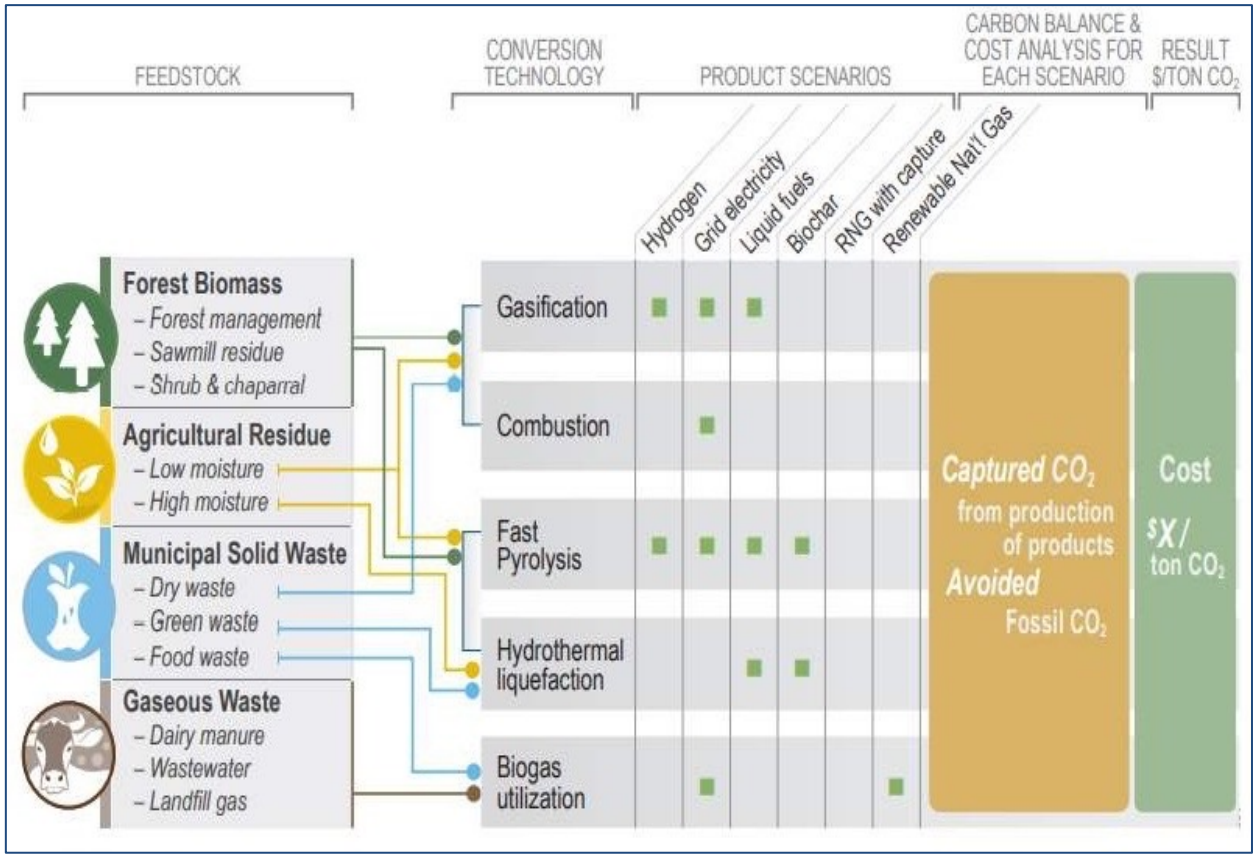


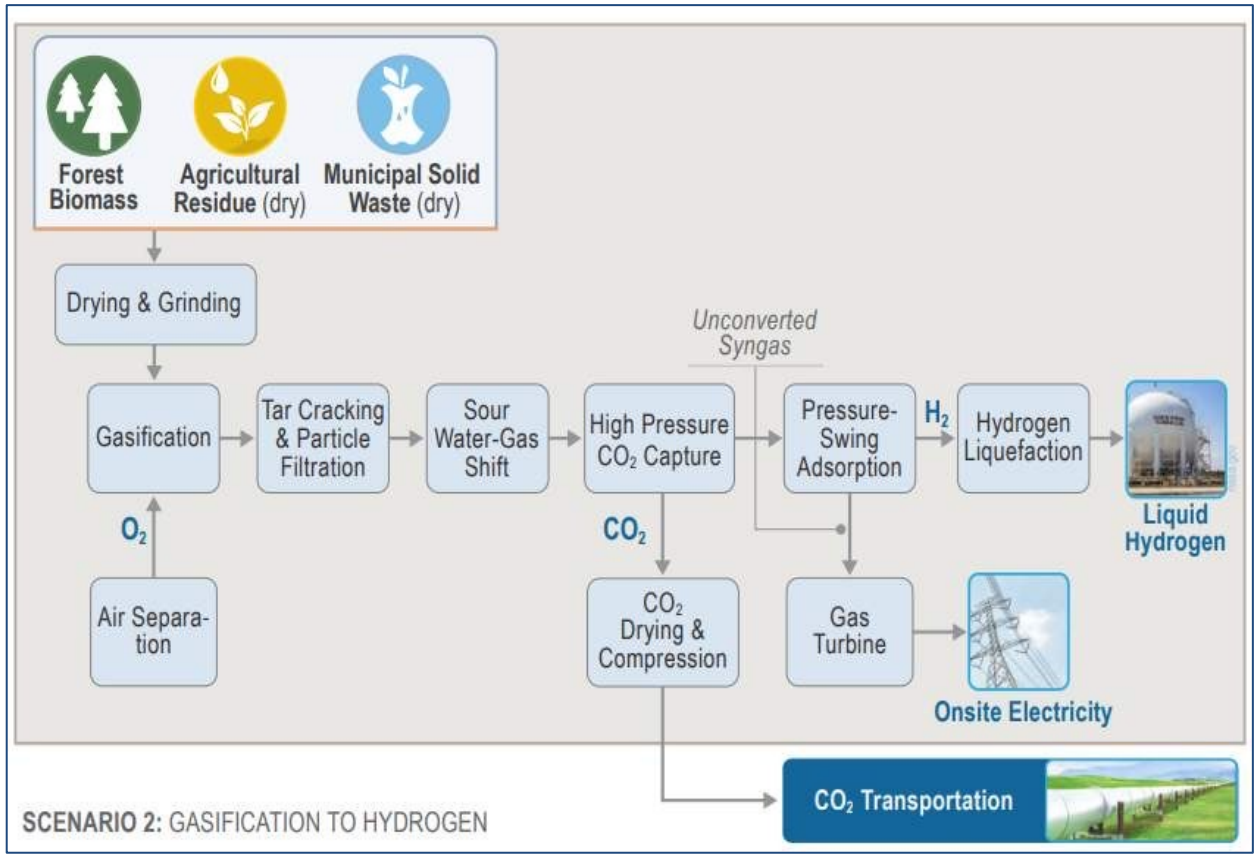
SGH2 SPEG Technology easily works with all types of feedstock

Feedstock: forest biomass, low moisture agricultural residues, dry municipal solid waste

Potential products: liquid fuels: green methanol, SAF, and green ammonia, hydrogen. Hydrogen further can be converted to Renewable Natural Gas (RNG) or use directly in stationary fuel cell power plant to produce baseload power.

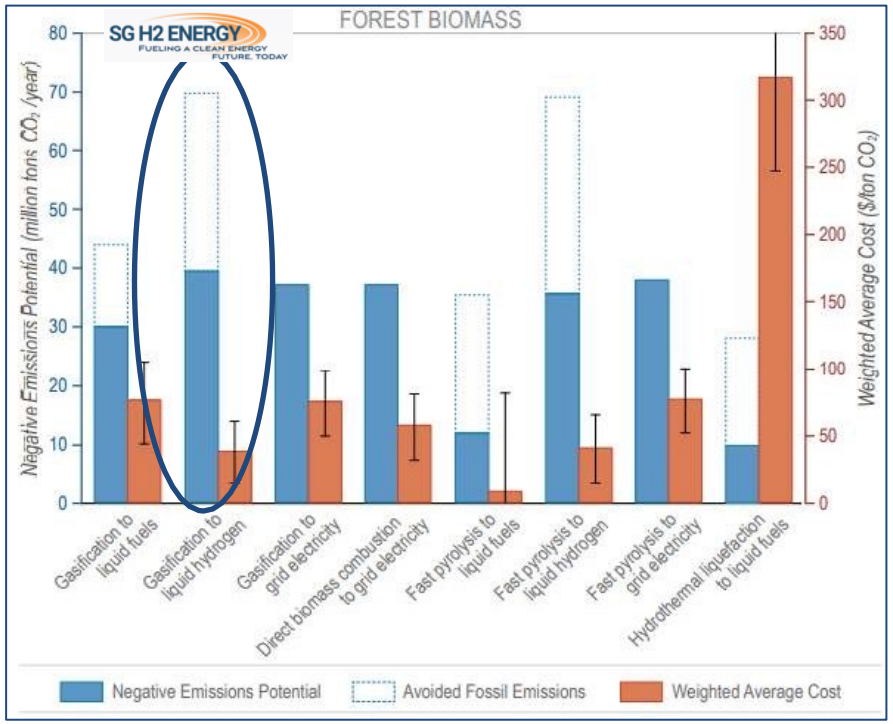
Key points: SPEG technology at TRL8 and all other equipment are commercial industrial systems. Addition of CCS unit will allow capture CO2 and further

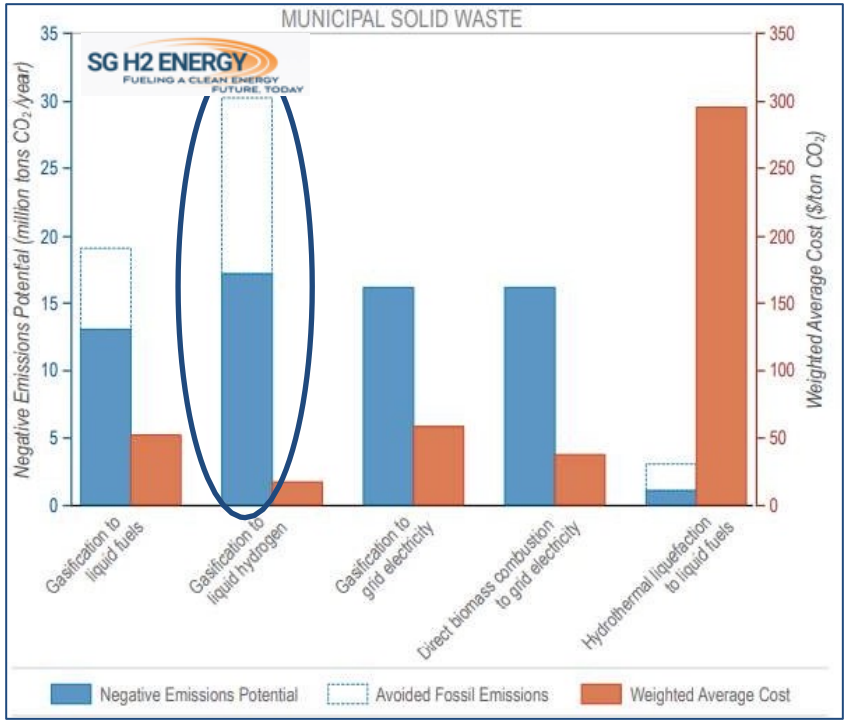


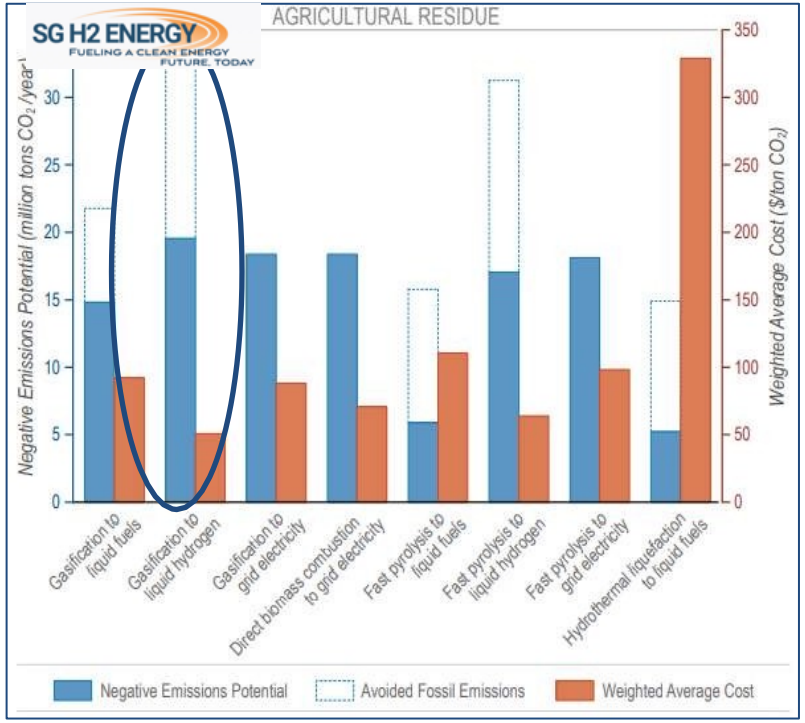


Source: Getting to Neutral Options for Negative Carbon Emissions in California. Sarah E. Baker, Joshuah K. Stolaroff, George Peridas, Simon H. Pang, Hannah M. Goldstein, Felicia R. Lucci, Wenqin Li, Eric W. Slessarev, Jennifer Pett-Ridge, Frederick J. Ryerson, Jeff L. Wagoner, Whitney Kirkendall, Roger D. Aines, Daniel L. Sanchez, Bodie Cabiyo, Joffre Baker, Sean McCoy, Sam Uden, Ron Runnebaum, Jennifer Wilcox, Peter C. Psarras, Hélène Pilorgé, Noah McQueen, Daniel Maynard, Colin McCormick, Getting to Neutral: Options for Negative Carbon Emissions in California, January, 2020, Lawrence Livermore National Laboratory, LLNL-TR-79610

Negative emissions potential, avoided fossil emissions, and estimated cost to capture CO2 for each type of feedstock, calculated for the year 2045







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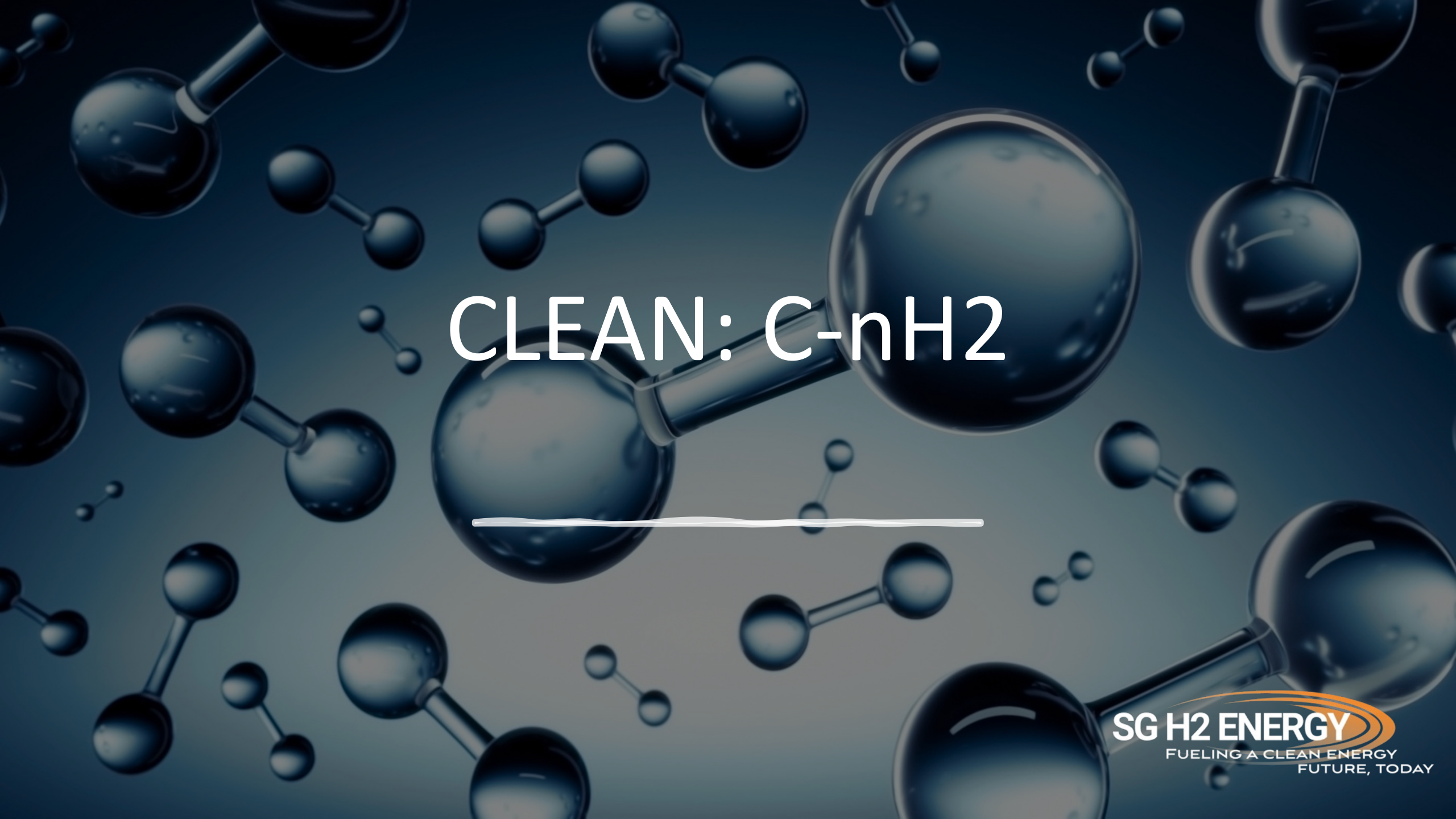

CLEAN: C-nH2
SG H2 ENERGY
FUELING A CLEAN ENERGY FUTURE, TODAY

SGH2 TECHNOLOGY

SPEG technology represents a game-changing solution that addresses two significant global challenges: climate change and waste pollution. By combining innovative approaches, we are able to tackle these crises and make a positive impact on the world.

SPEG technology represents a transformative solution that not only helps combat climate change but also tackles the pressing issue of waste pollution. Through our innovative approach, we strive to create a better and more sustainable world for future generations.

SGH2 C-nH2 is cost competitive with the cheapest, dirtiest fossil fuel derived hydrogen on the market. SGH2, headquartered in Washington DC, develops, builds, owns and operates this technology, with projects underway worldwide.

SPEG technology used by SGH2 Energy Global Corporation is based on the Plasma Technology originally developed by NASA for testing heat shield materials. This technology was designed to protect spaceships and astronauts from the intense heat generated during re-entry into the Earth's atmosphere.

SPEG technology produces C-nH2 (carbon-negative hydrogen) from a wide range of waste materials, including paper, plastics, tires, textiles, and municipal solid waste (MSW) with Zero emissions and toxic byproducts.

By leveraging advanced Plasma Technology, SGH2 has harnessed its potential for a completely different purpose: the conversion of waste materials into carbon-negative hydrogen (C-nH2). This innovative adaptation demonstrates the versatility and wide-ranging applications of plasma technology.

SGH2 GREENER THAN GREEN C-nH2

Proprietary state-of-the-art Solena Plasma Enhanced Gasifier (SPEG) technology successfully demonstrated at a full-size project in US and torch facility in Czech Republic

Avoids more carbon emissions than other hydrogen

Lawrence Berkeley National Lab and Life Cycle Associates group have determined that our process' carbon intensity goes up to - 180 gCO2eq/MJ of H2, compared to 0 gCO2eq/MJ from electrolysis hydrogen. Further, it is guaranteeing the highest amount of production tax credit per kg of H2. "Section 45V of IRA".

HYDROGEN: MORE CARBON REDUCTION AND LESS COST

	HYDROGEN TYPES	CARBON INTENSITY (gCO2eq/MJ)	PRODUCTION $/Kg H2
GREEN HYDROGEN	SGH2 Greener than green Hydrogen	Depending on the feedstock, it can be up to -180 gCO2eq/MJ (less than 0 Kg of CO2 per Kg of H2)	$2-$3
	Green Hydrogen (Electrolysis)	0 gCO2eq/MJ	$6 - $8
HYDROGEN FROM FOSSIL FUELS	Grey Hydrogen from NatGas	+12 KgCO2/KgH2	$2-$6 (cost of natural gas)
	Brown Hydrogen from Gasification of Coal	+20 KgCO2/KgH2	$2 - $3
BLUE HYDROGEN WITH CARBON CAPTURE & SEQUESTRATION	Grey Hydrogen	+12 KgCO2/ KgH2 with CCS	$4 - $8
	Brown Hydrogen	+20 KgCO2/KgH2 with CCS	$4 -$5

OUR C-nH2 CLEANER & CHEAPER THAN GREEN HYDROGEN BY ELECTROLYSIS

Per 4,550 tons Clean H2 Per Year

	SGH2 CLEAN HYDROGEN	ELECTROLYSIS
Water	20,000 m^3 /year	57,000 m^3 /year
Electricity	36,000 MWh /year	273,000 MWh /year
Cost	$2 - $3 /Kg H2	$5-$7 /Kg H2
Waste Avoided	- 42,000 ton /year	
Plot Space	5 acres	300 acres / solar panels
Carbon Intensity	Up to - 180 gCO_2e/ MJ	0 gCO_2e/ MJ

SPEG TECHNOLOGY PROCESS

The feedstock is delivered into a specialized compactor / extruder with nitrogen blanketing and fed continuously into the gasifier.

Clean Hydrogen

The syngas then goes into the water gas shift, before entering the Pressure Swing Absorber system, resulting in 99.97% pure hydrogen. Our process extracts all carbon from the waste feedstock, removes all particulates and acid gases, and produces no toxins or pollutants.

The feedstock is delivered to the Gasification facility by the recycling Company, the waste management company or biomass handling company already sorted, shredded and baled.

Syngas Production

Feedstock goes through a Plasma Enhanced Single Stage Gasifier that is a fixed bed counter current gasification process that utilizes plasma torch heat and oxygen enriched air as an oxidant to convert the waste materials into a hydrogen rich synthetic gas.

Cement

Natural Gas Distribution

Mobility

Ammonia

Iron & Steel

Oil Refinery

SPEG TECHNOLOGY

SGH2's unique gasification process uses a plasma-enhanced thermal catalytic conversion process optimized with oxygen- enriched gas. In the gasification island's catalyst-bed chamber, plasma torches generate such high temperatures (3500º-4000º C), that the waste feedstock disintegrates into its molecular compounds, without combustion ash or toxic fly ash.

_____

As the gases exit the catalyst-bed chamber, the molecules bound into a very high-quality hydrogen-rich bio-syngas free of tar, soot and heavy metals. The syngas then goes through a water gas shift reactor before being fed into the Pressure Swing Absorber system resulting in hydrogen purity greater than 99.97% as required per the SAE-J2719 standard for use in Proton Exchange Membrane fuel cell vehicles.

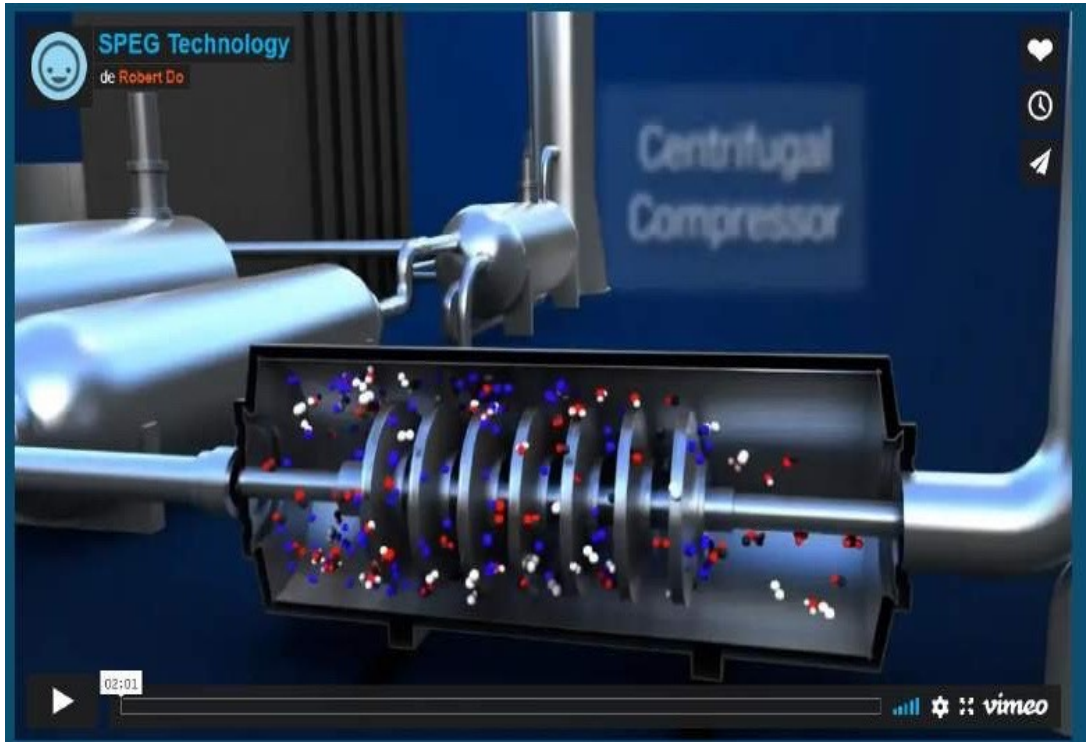
_____

The process extracts all carbon from the waste feedstock, removes all particulates and acid gases, and produces no toxins or pollution. The end result is high purity hydrogen and a biogenic CO2, which can be further captured with our CCS system to produce a C-nH2.

_____

"Gasification" is the process of "partial-oxidation" (in contrast to combustion/burning which is "complete oxidation") of the waste biomass feedstock thus eliminating the polluting emissions of incinerator flue gases such as SOx, NOx, PMs and Dioxins / furans.

SPEG Technology Explained



https://vimeo.com/411145543

STRATEGIC PARTNERS

Feedstock

The municipality and/or

ALLAN COMPANY

Gasification island

SG H2 ENERGY
FUELING A CLEAN ENERGY FUTURE, TODAY

Process Integration and Balance of Plants

FLUOR

BLACK & VEATCH

H2 Production

Air Liquide
creative oxygen

ABB

Linde

Hydrogen Off taker

Global leaders in O&G and industrial gases

Performance Guarantees

Munich RE

SGH2 LANCASTER: BEST IN CLASS CONSORTIUM

- Lancaster City
- US Senate & Congress (CA)
- SGH2 Energy
- Iwatani
- Fluor
- Stork
- ABB
- Marubeni
- Chart Industries
- Sempra Infrastructure
- Mitsubishi
- Toyota North America
- Sojitz

SIGNING CEREMONY SEPTEMBER 2021

SGH2 LANCASTER

LARGEST BASELOAD CLEAN HYDROGEN PRODUCTION PLANT IN U.S

GENERATING 4.5 MILLION KG OF CLEAN HYDROGEN ANNUALLY

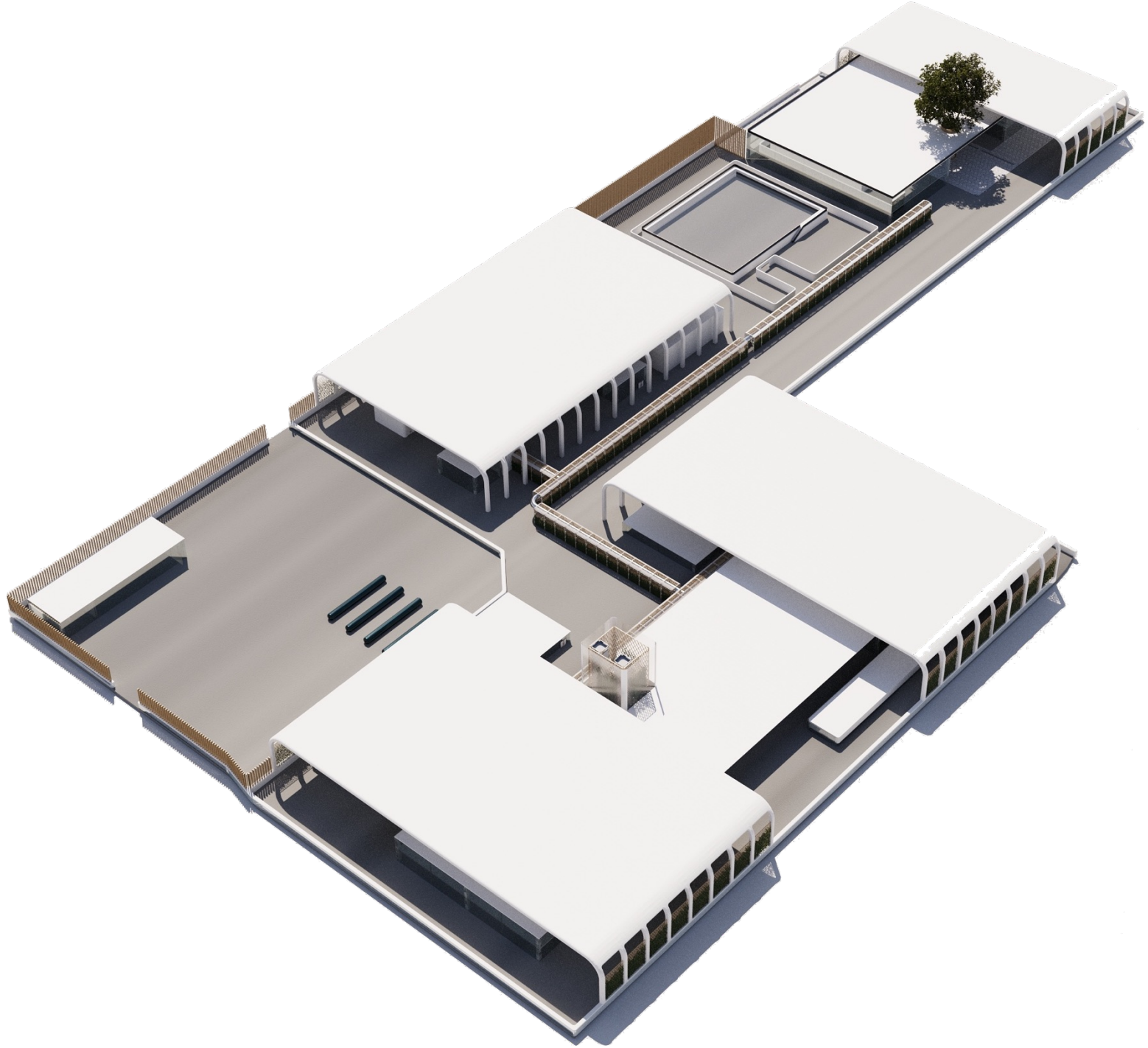
10 YEAR OFF-TAKE CONTRACTS WITH THE LEADING HYDROGEN FUELING STATION OPERATORS

PUBLIC - PRIVATE PARTNERSHIP WITH THE CITY OF LANCASTER USING 120 TONS/DAILY OF UNRECYCLABLE MIXED PAPER WASTE.

AWARDED $3 MILLION CEC GRANT.

CEQA/CUP APPROVED DECEMBER 12, 2022

OPERATING 24/7, 350 DAYS ANNUALLY



California, the most advanced clean energy state in the US , has strong policies and funding for ambitious hydrogen and fuel cell technology adoption in transportation and power. The state's transportation sector is its largest source of GHG emissions, generating 37% of total emissions. California aims to install a minimum 200 hydrogen refueling stations by 2025 and 1,000 stations by 2030 to fuel one million fuel cell vehicles.

With a production cost benchmark of less than US $2.5 per kg for clean hydrogen (H2), the Lancaster facility will benefit from strong economies of scale across the entire clean hydrogen value chain. The production facility is designed to be modular and easily scalable, allowing for efficient expansion as demand for clean hydrogen grows. This cost-effective and flexible approach positions the Lancaster facility to meet the increasing demand for clean hydrogen and contribute to the transition towards a more sustainable energy future.

SMR (Steam Methane Reformer) of natural gas to produce grey H2 generates carbon emissions of 12.3 kg CO2/kg of grey H2.

Renewable Natural Gas (RNG) as a feed for making clean H2 can only be produced at small quantities and a high price making H2 from RNG cost inefficient and limited in quantity, due to the scarce amount of wet fermentable

Green power-to-gas or electrolytic H2 : (i) intermittent production due to availability of renewable power; (ii) high energy load of 60 KW/h required to produce1 kg of H2; (iii) high costs of power; and (iv) high demand for large land and water usage resulting in currently high costs of US$6-$8 per kg clean H2.

SGH2
Sierra Project

Sierra Institute
for Community and Environment

- Largest baseload clean LIQUID hydrogen production plant in U.S
- Generating 11.5 million kg of LIQUID HYDROGEN
- Operating 24/7, 350 days annually.
- Partnership with IWATANI; Off-take contract to supply HRS.
- MOU with SIERRA INSTITUTE, 360 tons/day of forest residues from forest clearings, preventing wildfires
- Awarded $500,000 DOC Grant phase I . Eligible for phase ii $25 M Grant .

SGH2 CORP.
THE WORLDWIDE SOLUTION

CAN SCALE QUICKLY

Stacked modular design is built for rapid scale and linear distributed expansion, at lower capital costs, and a fraction of the land required by other green hydrogen facilities reliant on large scale solar and wind farms. All engineering and construction is standardized and quality assured, performed in collaboration with the largest engineering, procuring and construction companies in the world such as Fluor Group.

PROVIDES CLEAN HYDROGEN YEAR-ROUND, 24/7

Unlike other hydrogen production reliant on solar or wind, the SPEG process operates on a year-round base load capacity and can produce hydrogen at scale more reliably.

FUELING A CLEAN ENERGY FUTURE, TODAY

Bloomberg New Energy Finance analysis predicts dramatic greenhouse gas reductions when green hydrogen becomes cost competitive, and forecasts green hydrogen costs dropping to U.S. $2 per kilogram by 2030 in India and Western Europe. SGH2 is producing greener than green C-nH2 at that cost today.

SGH2 TYPICAL MODULAR PROJECT

SMALL FOOTPRINT, BIG CAPACITY

LAND REQUIREMENT

The processing modular plant of SGH2 Energy will require an area of 5 acres (2 hectares). The remaining acreage will vary depending on the storage requirements for feedstock and the method of hydrogen storage and transportation from the site.

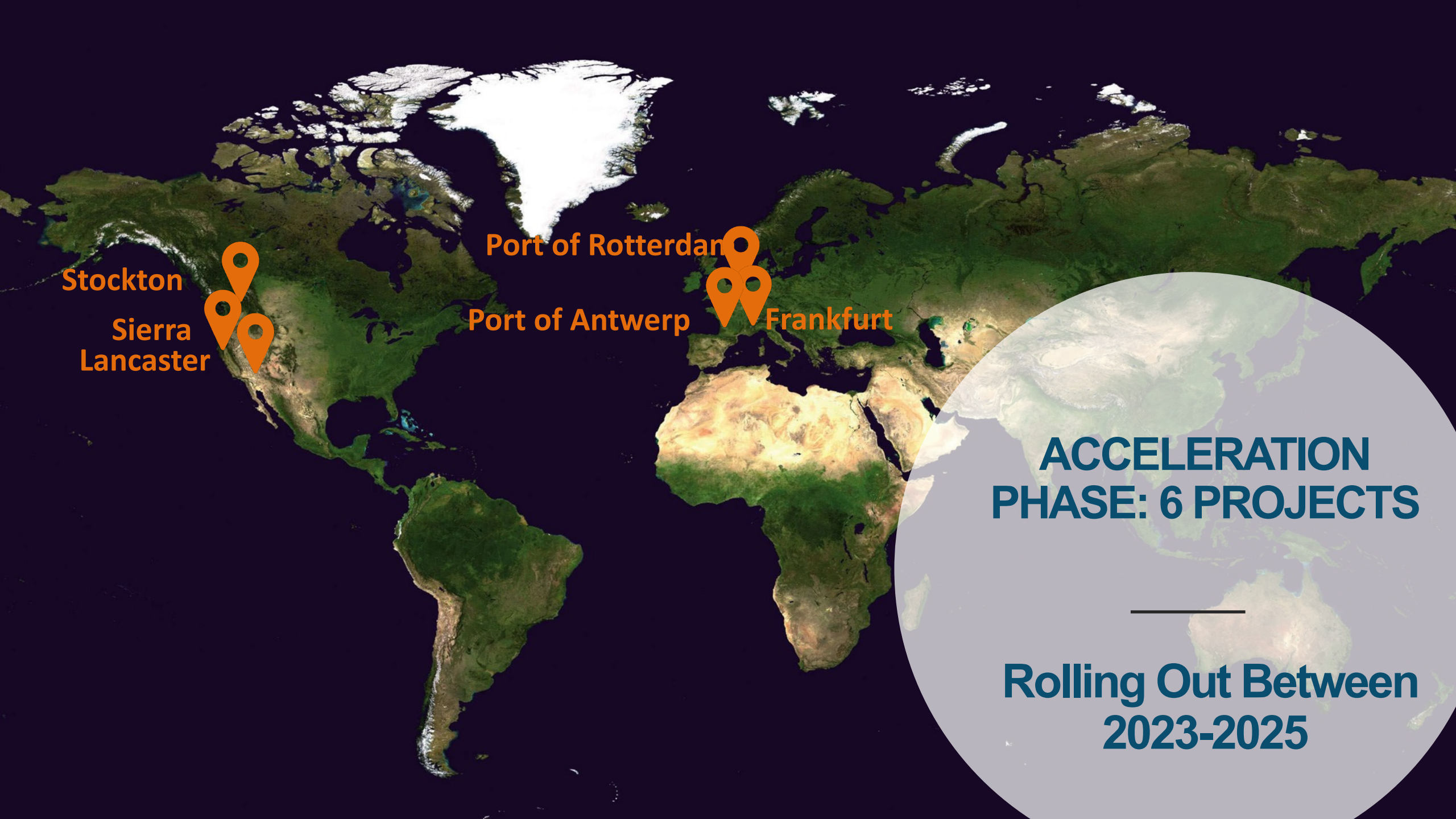
FEEDSTOCK REQUIREMENT

The processing plant of SGH2 Energy is designed to handle 120 metric tons per day of biomass, which is equivalent to approximately 6 trucks per day. The biomass should ideally have a minimum calorific content of 4,000 Kcal/Kg and a moisture content of no more than 25%.

C-nH2 PRODUCTION

13 T of **C-nH2** per day or 4,550 T per year.

Equivalent to 15 million Nm^3 per year of natural gas.



ACCELERATION PHASE: 6 PROJECTS

Rolling Out Between 2023-2025


GROWTH PHASE 2024-2040

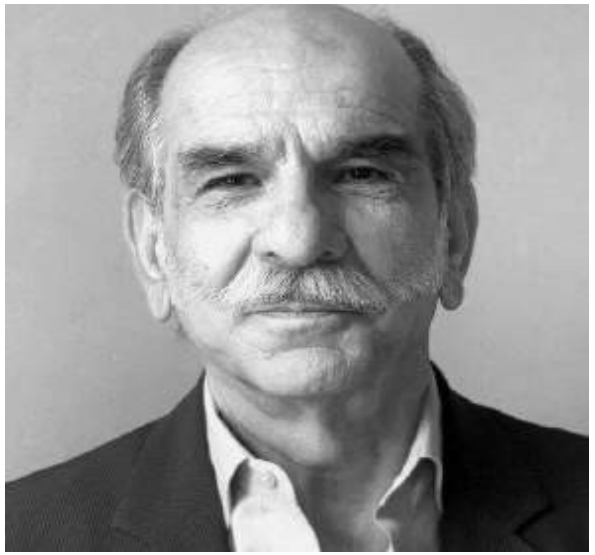

MANAGEMENT TEAM

Robert T. Do MS., MD
Chief Executive Officer

Sylvain Motycka, PhD
Chief Technology Officer

Paul Elberse
Chief Financial Officer

Rahul Chopra
Board Director



Souren Hakopian
Senior Advisor to the CEO

Eric Keller
Executive Vice President

Chaitanya Khare
Director of Operations

Eddie Robinson PE
Project Manager

Morrow Cater
Chief Communications Officer

Xenia Seliver
Head of Corporate Affairs

Alex Hakopian
Process Engineer

Luisa Rivas
Financial Analyst

SGH2 HAS CREATED WAVES OF POSITIVE NEWS FLOW

Forbes

The World's Biggest Green Hydrogen Plan is Planned for California. Its Prospects For Electric Power and Transportation?

abc NEWS

Why green hydrogen is the renewable energy source to watch in 2021

S&P Global Platts

Zero-carbon could be cost-competitive in transport sector by 2030

Los Angeles Times

First of its kind hydrogen plant planned for Los Angeles County

THE WORLD NEWS

California City approves the world's largest green hydrogen plan that turns trash into clean power

RECHARGE

Green than green hydrogen to be produced at same cost as grey H2 at world's largest facility

See more at www.SGH2Energy.com

CLEAN HYDROGEN IS THE FUTURE OF ENERGY

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Please send any enquiries with respect to this document, questions and any request for additional information to: Xenia Seliver, Head of Corporate Affairs SGH2 Energy Global Corporation. 1015 15 St, Suite 600, Washington, D.C. 20005

SG H2 ENERGY

FUELING A CLEAN ENERGY FUTURE, TODAY

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