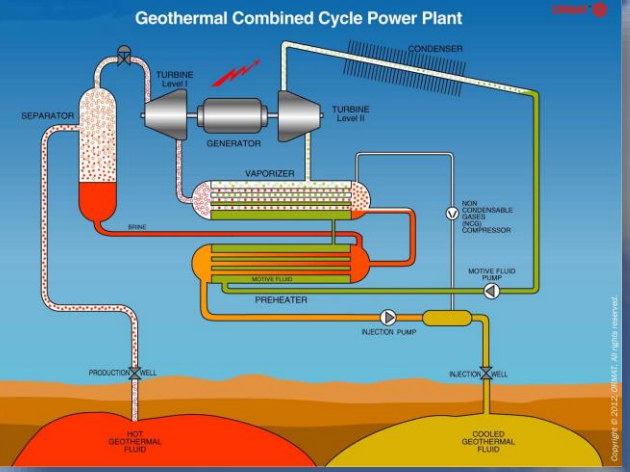
Geothermal Combined Cycle Power Plant
CONDENSER
TURBINE Level I
TURBINE Level II
SEPARATOR
GENERATOR
VAPORIZER
NON CONDENSABLE GASES (NCG) COMPRESSOR
BRINE
MOTIVE FLUID
MOTIVE FLUID PUMP
PREHEATER
INJECTION PUMP
PRODUCTION WELL
INJECTION WELL
HOT GEOTHERMAL FLUID
COOLED GEOTHERMAL FLUID
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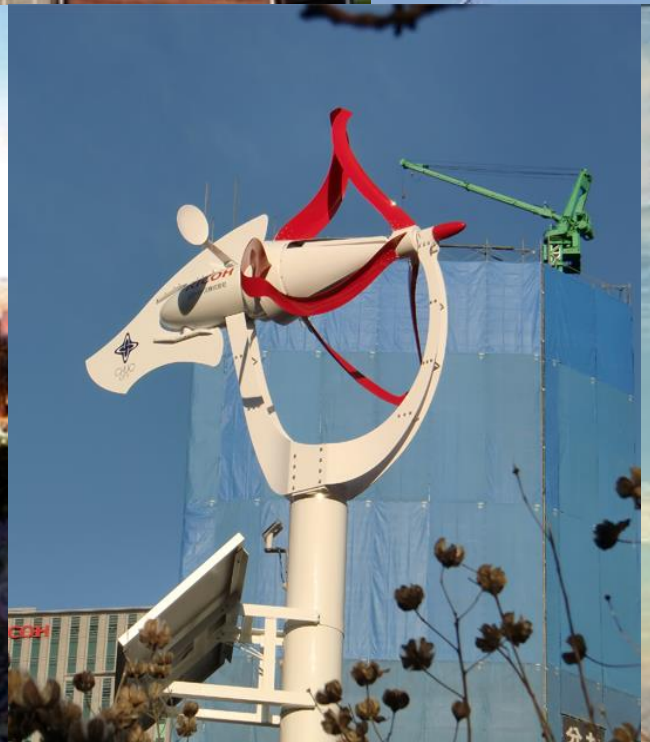
Bloomberg

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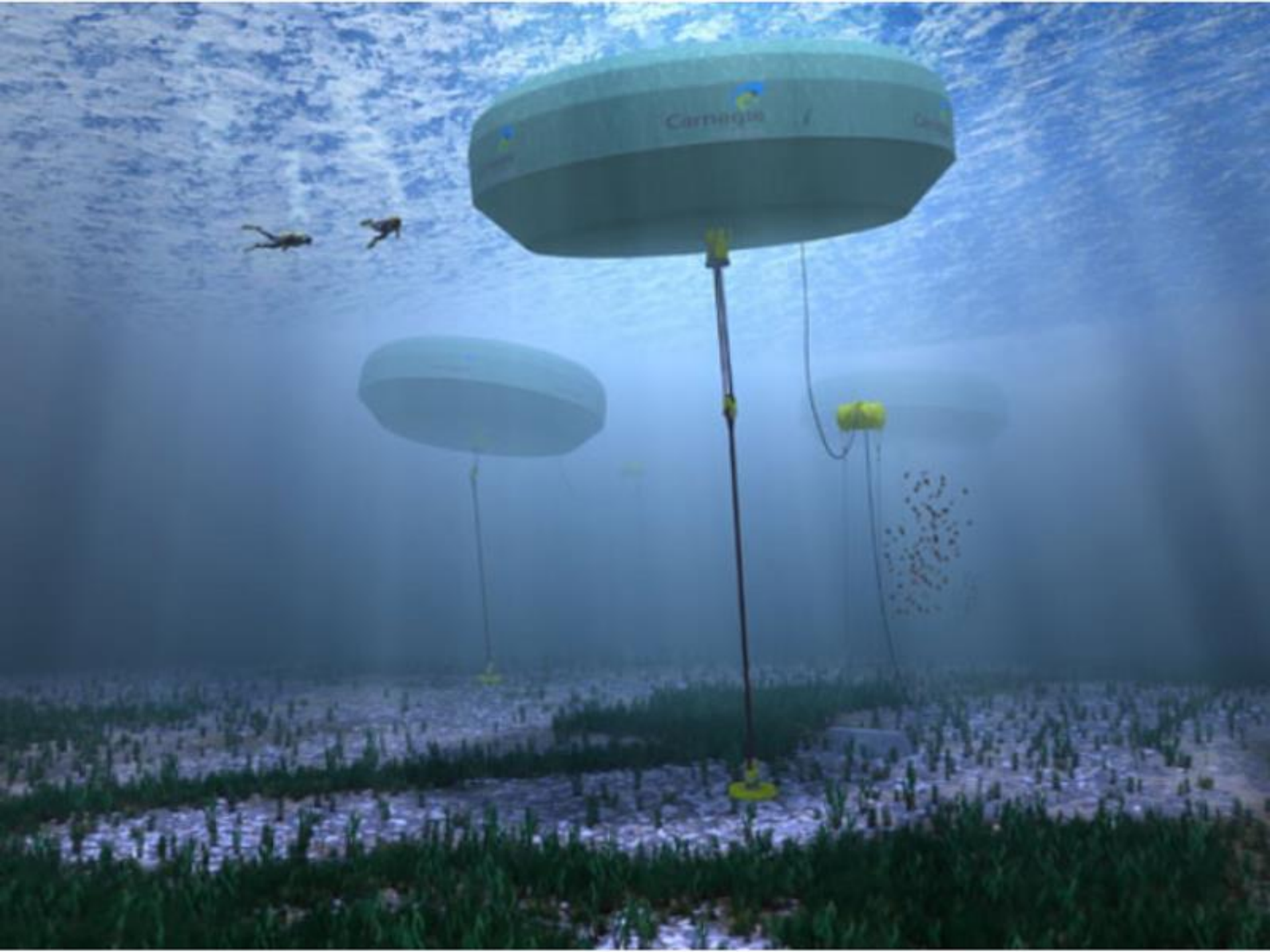

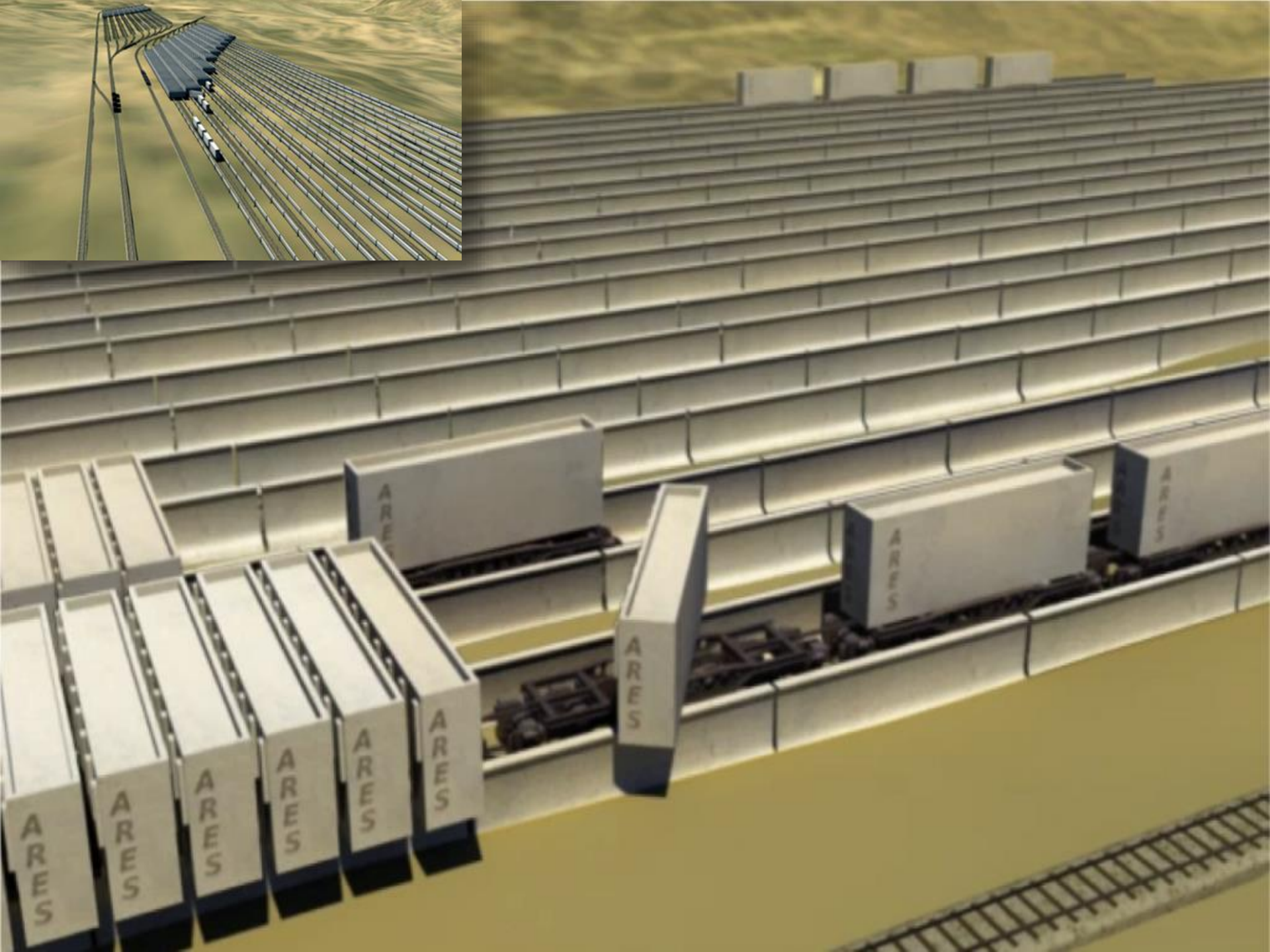
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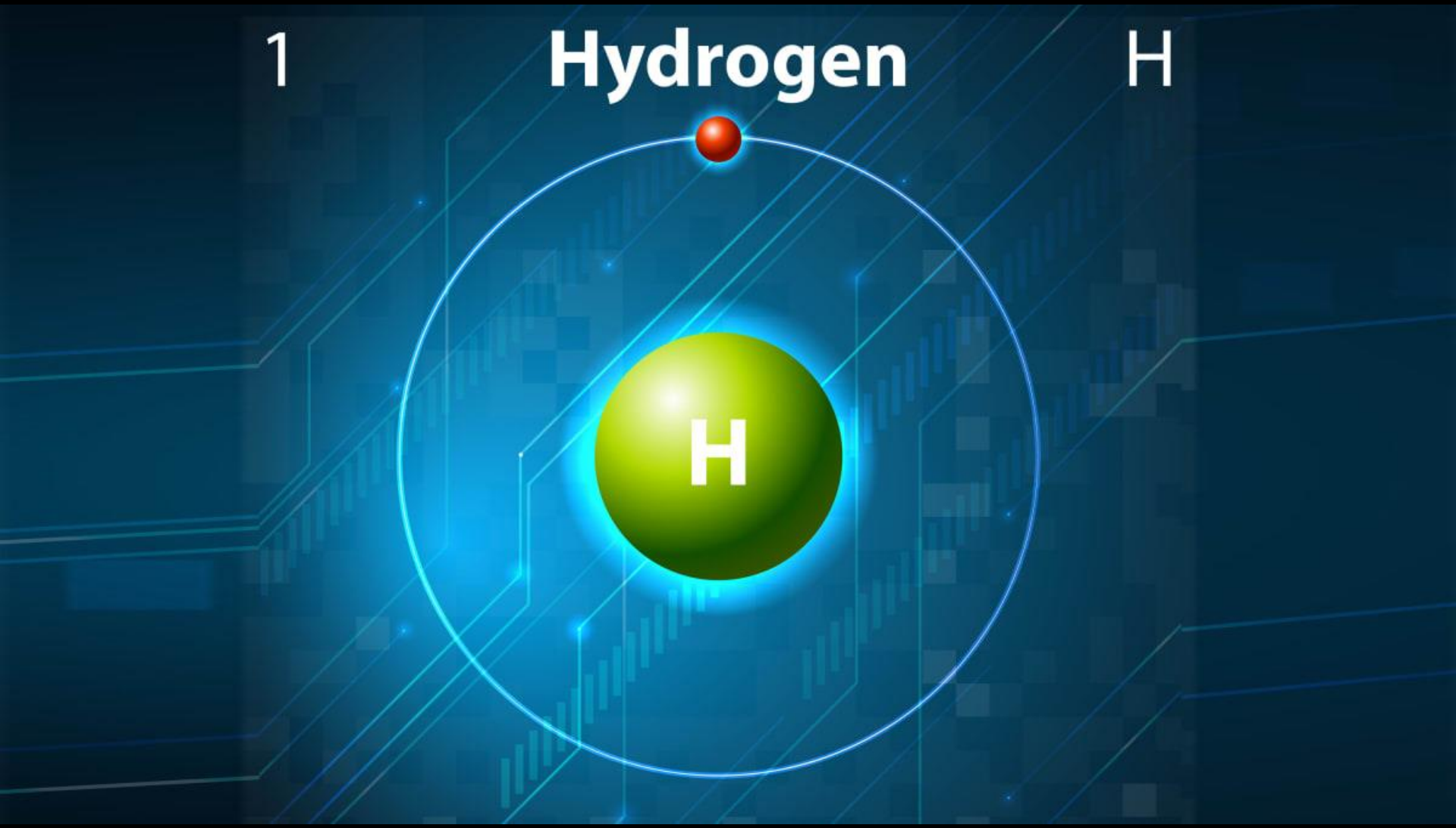
1
Hydrogen
H
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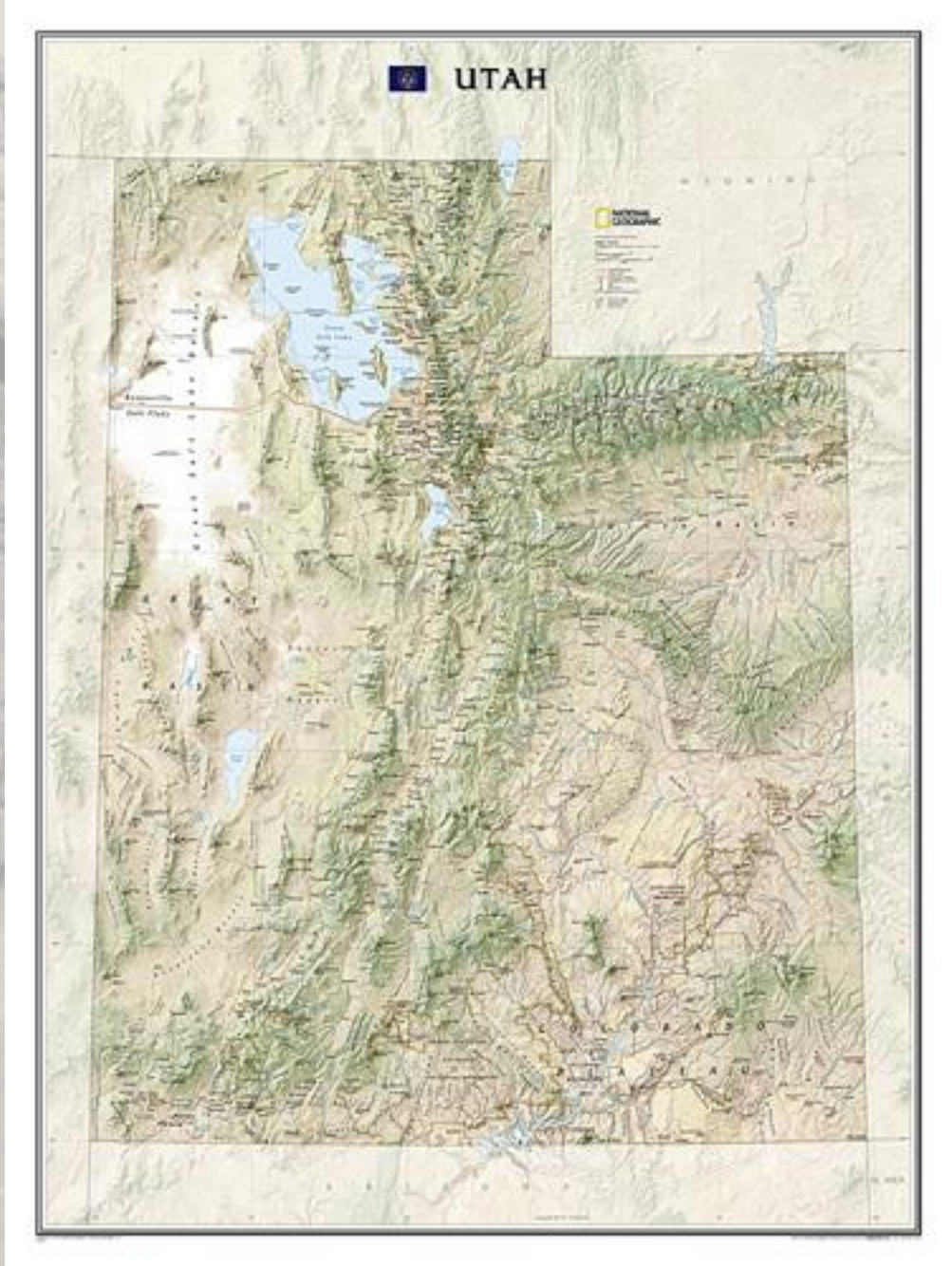
Abundant Natural Resources

- Crude Oil
- Coal
- Natural Gas
- Water supply
- Solar Zones
- Wind Farms
- Geothermal Resources




Provo Airport
element one
TECHNOLOGIES
POWER INNOVATIONS
Mike Jense Pkwy
Provo Airport
HYDROGEN PLANT
H2O TO H2
Google Earth

PRODUCING HYDROGEN FOR

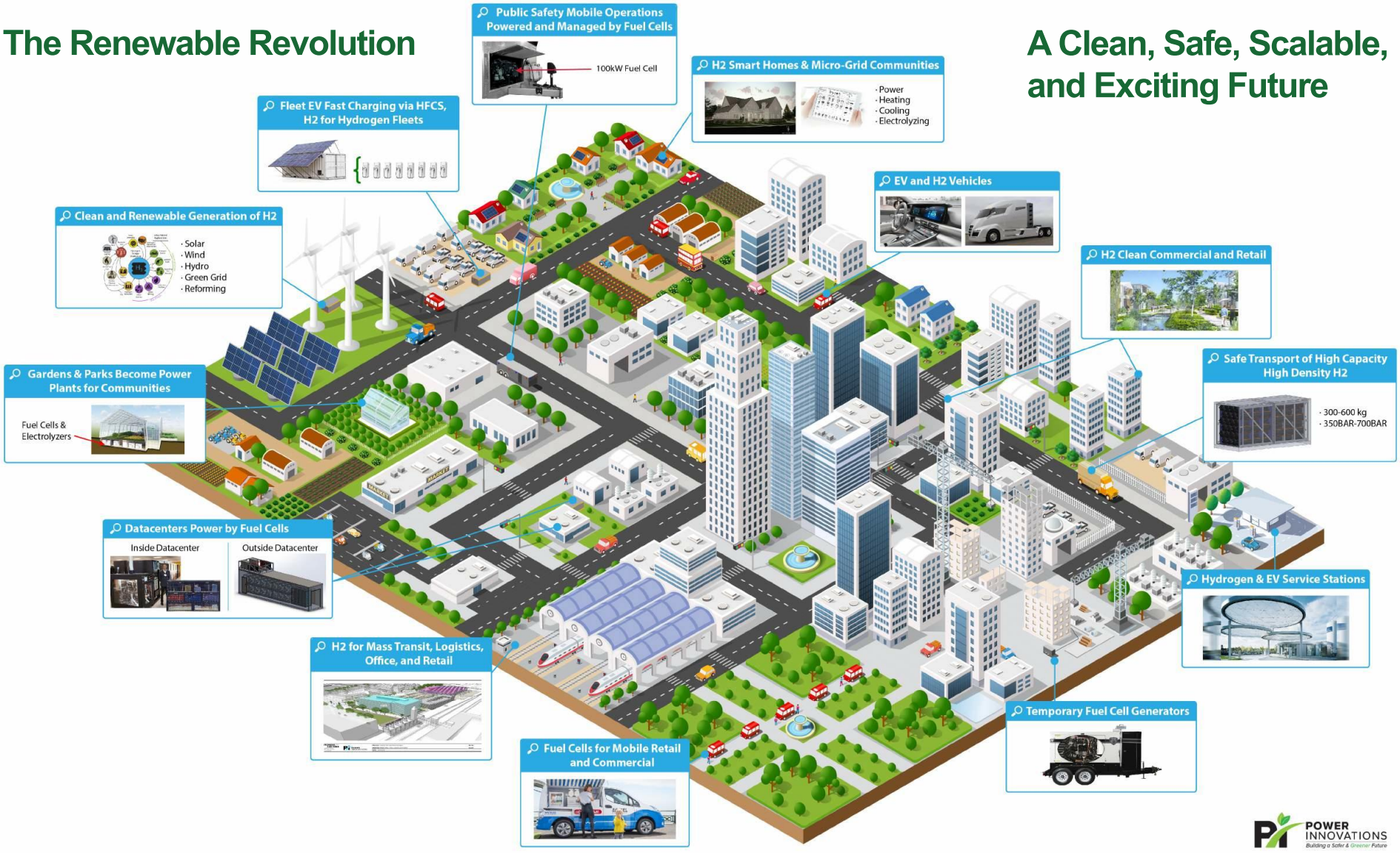
element one TECHNOLOGIES

POWER INNOVATIONS

©2019 Google

The Renewable Revolution

A Clean, Safe, Scalable, and Exciting Future



POWER INNOVATIONS
Building a Safer & Greener Future

Estimated over 571,000 people commute to work each day

UTA

Hydrogen Powered Train

HYDROGEN-POWERED TRAINS PRODUCE

ZERO EMISSIONS

© 2018 Google
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Google Earth

HYDROGEN-POWERED COMMUTER TRAIN

LOGAN TO PROVO

Park City
Hydrogen Powered Train
HydrogenPlant
Car Only Hydrogen Station
Sandy
American Fork
Logan
Dominion Energy
Salt Lake City
Ogden
Layton
Brigham City
Magna
Tremonton Larger Truck and Car Hydrogen Station
Tooele
80
84
15
154
71
175
201
91
40
6
189
21.9 mi
© 2018 Google
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Google Earth


Just a 30% reduction in commuters
Would save approx. 36,000,000 TONS
CO2 annually


3M
AIRBUS
Air Liquide
AIR PRODUCTS
ALSTOM
AngloAmerican
BMW GROUP
BOSCH
Invented for life
国家能源集团
CHN ENERGY
Cummins
DAIMLER
EDF
ENGIE
equinor
faurecia
inspiring mobility
GM
Great Wall
HONDA
HYUNDAI
Iwatani
JM
Johnson Matthey
Inspiring science, enhancing life
JXTG Nippon Oil & Energy
Kawasaki
KOGAS
PLASTIC OMNIUM
SINOPEC
THE LINDE GROUP
thyssenkrupp
TOTAL
TOYOTA
WEICHAI
AFCEnergy
BALLARD
Faber
GORE
HEXAGON
HYDROGENICS
Marubeni
McPhy
Mitsubishi Corporation
MITSUBISHI HEAVY INDUSTRIES
MITSUI&CO.
nel
PLUG POWER
REFIRE
SMBC
Sumitomo Corporation
SoCalGas
TOYOTA TSUSHO
TRUEZERO
Vopak


18%
of final energy demand
6 Gt
annual CO_2 abatement
$2.5 t
annual sales (hydrogen and equipment)
30 m
jobs created

CEO-led partnership adds six new members demonstrating increased support for hydrogen technologies

Brussels, 18 June 2019 – The Hydrogen Council today announced that six new member companies have joined the group. These include BP as a steering member and AVL, ITOCHU Corporation, The Liebherr Group, Power Assets Holdings Limited, and SinoHytec as supporting members. The continued growth of the Council – a global CEO-led initiative for hydrogen technologies – is in direct response to the acknowledgement that hydrogen can play an important role in decarbonising the global economy.

This group of new members brings the Council to **60 total companies, collectively representing more than €2.6 trillion in revenue and 4.2 million jobs around the world.** The coalition has more than quadrupled since its launch in 2017 with 13 founding members. Covering all key geographies and sectors, the Council uses its global reach to provide guidance on scaling hydrogen use around the world.

"The global hydrogen industry is stronger than ever. Businesses are betting on hydrogen, investing in multi-billion-dollar projects and developing new products. Hydrogen Council members are leading this effort and working to increase cooperation between industry, government, and investors," said **Euisun Chung, Executive Vice Chairman of Hyundai Motor Group and Co-Chair of the Hydrogen Council.** "I welcome our newest members and look forward to working together to build the hydrogen economy."

YDROGEN – SCALING UP
OR CLEAN AIR, ENERGY ECURITY & JOBS

VELOPING A REGULATORY AMEWORK & FUNDING SCHEMES ROUGH INTERNATIONAL ULTILATERAL COLLABORATION

Hydrogen Council

WHY HYDROGEN?

- To deliver on Paris Agreement commitments and reduce CO_2 emissions by 60% by 2050, governments need to change their energy and transport systems while maintaining strong, competitive economies.
- Hydrogen offers clean, safe and ready-to-deploy solutions capable of helping solar, wind and other energy sources work together and keeping our systems operating smoothly, securely and with low emissions.
- Hydrogen's potential has been widely recognized and leading geographies are moving to seize the opportunity. To ensure large scale deployment, multilateral international collaboration between governments, industry and financial players will be required.

E WORLD IS MOVING...

China plans to put in place 300 hydrogen refueling stations by 2025 and 1,000 by 2030. This infrastructure will support 50,000 fuel cell electric cars by 2025, expanding to one million by 2030.

Tokyo's governor has designated hydrogen as the "energy star" of the 2020 Olympics - with the Olympic Village powered by fuel cells and athletes shuttled throughout the games by hydrogen-powered vehicles.

Creating net-zero industrial value chains in Carbon2Chem®, thyssenkrupp and other industrial partners demonstrate how to convert carbon-rich offgases of a steel plant to green chemical products by using electrolysis and chemical synthesis technologies.

California is nurturing deployment of fuel cell electric vehicles and associated infrastructure through its ZEV Regulation and co-funding of hydrogen refueling stations.

Cities are excited about hydrogen. The H21 Leeds City Gate pilot project is converting the entire city's heating grid to 100% hydrogen, testing a concept that could eventually span the entire UK.

Hydrogen's energy density makes it perfect for long distance transport and heavy loads. Alstom's Coradia iLint is the world's first hydrogen passenger train: a greener, quieter alternative already operational in Germany.

HAT ROLE CAN YOU PLAY?

ymakers are at the center of ransition. You hold the power ponentially scale up hydrogen ons and deliver benefits to your ns – clean air, energy security, cost and new jobs.

The industry needs a clear and stable **regulatory environment and a level playing field** for all technologies. The measures you put in place give a signal to investors to get involved, boosting economic growth and competitiveness as a result.

Help unlock hydrogen's potential and harness the benefits of the next big thing in clean energy. The industry has developed a **concrete roadmap** to show how to get there. Read it and join the hydrogen revolution!

HAT COULD HYDROGEN DO FOR YOU?

M HIGH. BECAUSE THE HYDROGEN FUTURE HERE, AND IT IS READY TO SCALE UP.

GET IN TOUCH!

@hydrogencouncil

Hydrogen Council

secretariat@hydrogencouncil.com

HYDROGEN – SCALING UP
THROUGH STRONG PARTNERSHIPS

WORKING TOGETHER WITH GLOBAL STAKEHOLDERS

Hydrogen Council

WHAT WE KNOW

- Hydrogen technologies are here - mature, safe and ready to be deployed at scale.
- The potential is huge – by 2050, hydrogen could meet 18% of the world's final energy demands, provide 30 million jobs around the world, prevent 6 Gt of CO_2 emissions, and create a $2.5 trillion market for hydrogen and fuel cell equipment.
- Successful demonstration projects, large pilots and captive fleets have introduced them to the market around the world and established policy and financing requirements.
- Yet, lack of information, misconceptions and fragmentation have been hampering hydrogen's global progress.

WHAT CAN WE DO ABOUT IT?

NOW *is the time for global stakeholders to come together and create an environment that will scale up hydrogen solutions by:*

- Speaking one voice to inform stakeholders and educate consumers
- Creating platforms for public-private collaboration
- Sharing know how and resources
- Fostering standardization
- Highlighting market activation and real business cases and how to make them happen

MULTI-STAKEHOLDER GROUPS play a fundamental role in bringing public and private players to the same table, creating strong partnerships to unlock potential and drive mass deployment.

TOWARDS A GLOBAL ECOSYSTEM

A rich international ecosystem already exists, and – encouraged by industry's decisive actions – many new players are coming on board to explore how hydrogen can deliver on their needs.

WHAT CAN YOU DO?

The industry has developed an ambitious yet realistic roadmap to show how to get to scale. Read it here , share it with your network and join the hydrogen revolution!

WHAT COULD HYDROGEN DO FOR YOU?

AIM HIGH. BECAUSE THE HYDROGEN FUTURE IS HERE, AND IT IS READY TO SCALE UP.

GET IN TOUCH!

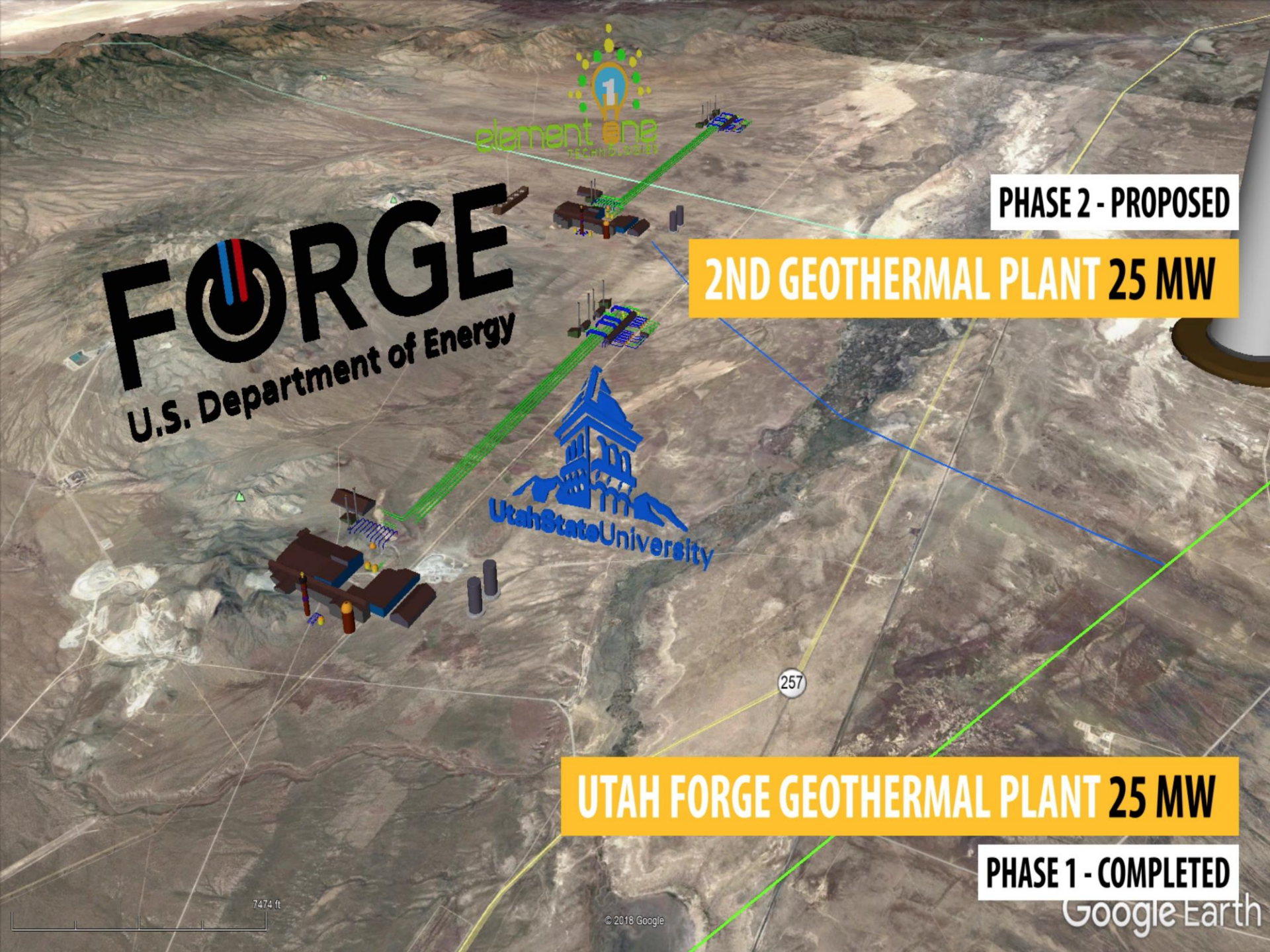
@hydrogencouncil

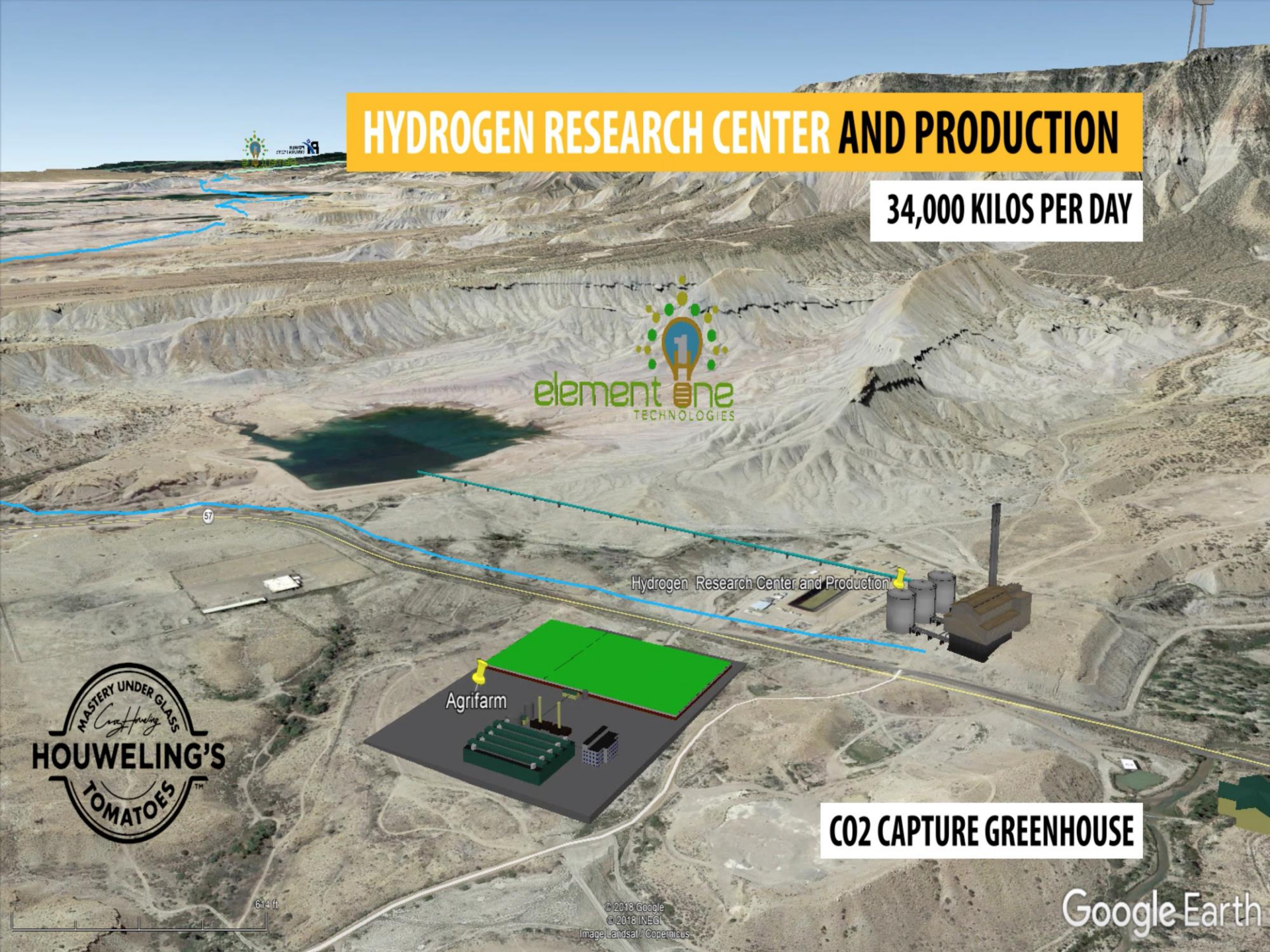
Hydrogen Council

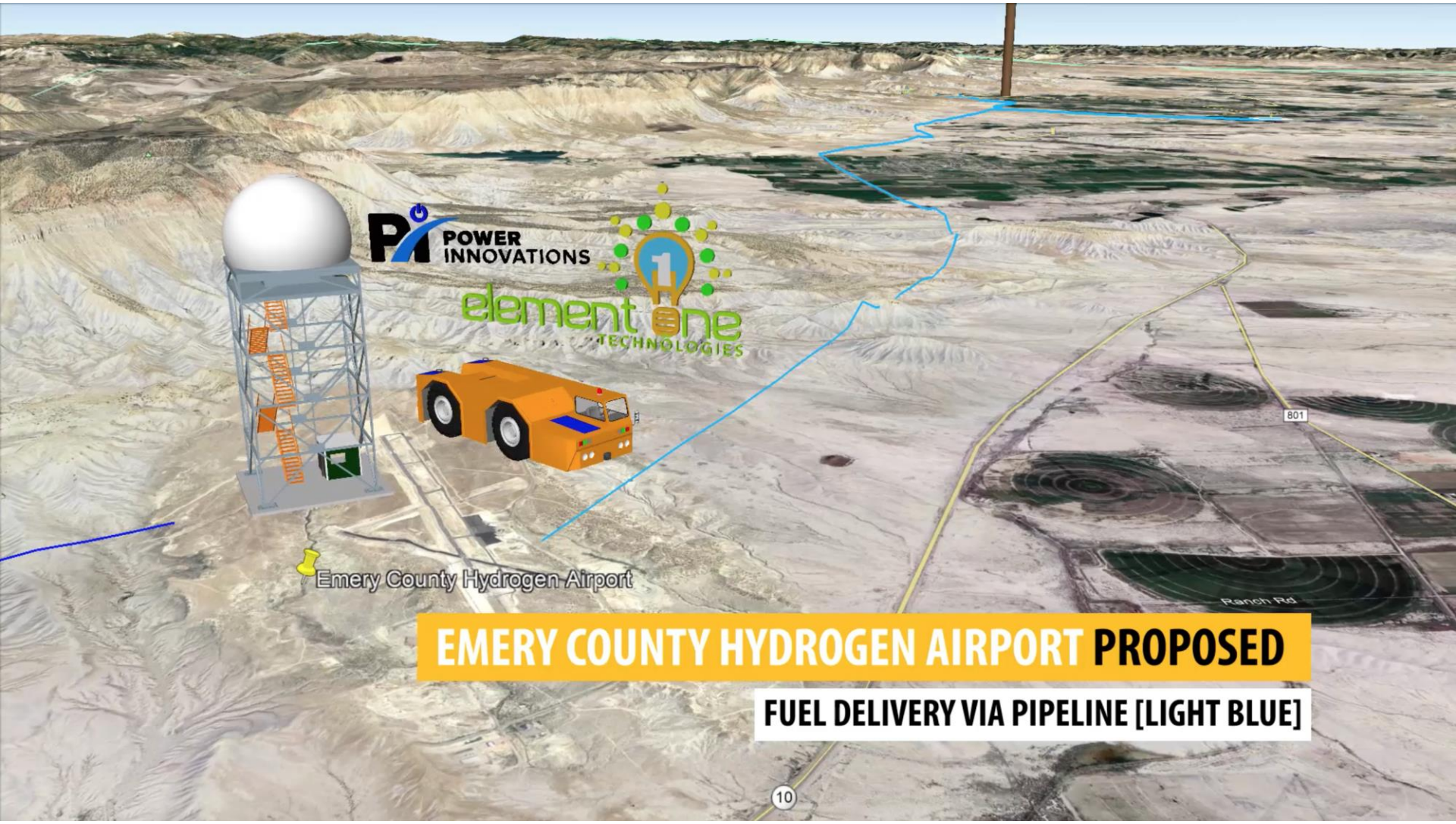
secretariat@hydrogencouncil.com

The Hunter and Huntington Power Plants

- 4,000,000 tons of coal per year consumed over the past 40 years
- 40 X 4,000,000 = 160.000,000 tons
- 160,000,000 X .05 = 8,000,000 tons of Hydrogen
- 8,000,000 X 907 = 7,256,000,000 kilos of hydrogen inherent in that same coal
- Hydrogen is selling for $16.49 per kilo in the State of CA
- 7,256,000,000 X $10 = $72,560,000,000/40 = $1,814,000,000 of Hydrogen in coal per year


element one
TECHNOLOGIES
FORGE
U.S. Department of Energy
UtahStateUniversity
PHASE 2 - PROPOSED
2ND GEOTHERMAL PLANT 25 MW
257
UTAH FORGE GEOTHERMAL PLANT 25 MW
PHASE 1 - COMPLETED
7474 ft
© 2018 Google
Google Earth


HYDROGEN RESEARCH CENTER AND PRODUCTION
34,000 KILOS PER DAY
element one
TECHNOLOGIES
Hydrogen Research Center and Production
Agrifarm
MASTERY UNDER GLASS
HOUWELING'S
TOMATOES
CO2 CAPTURE GREENHOUSE
614 ft
© 2018 Google
© 2018 INEGI
Image Landsat / Copernicus
Google Earth


POWER INNOVATIONS
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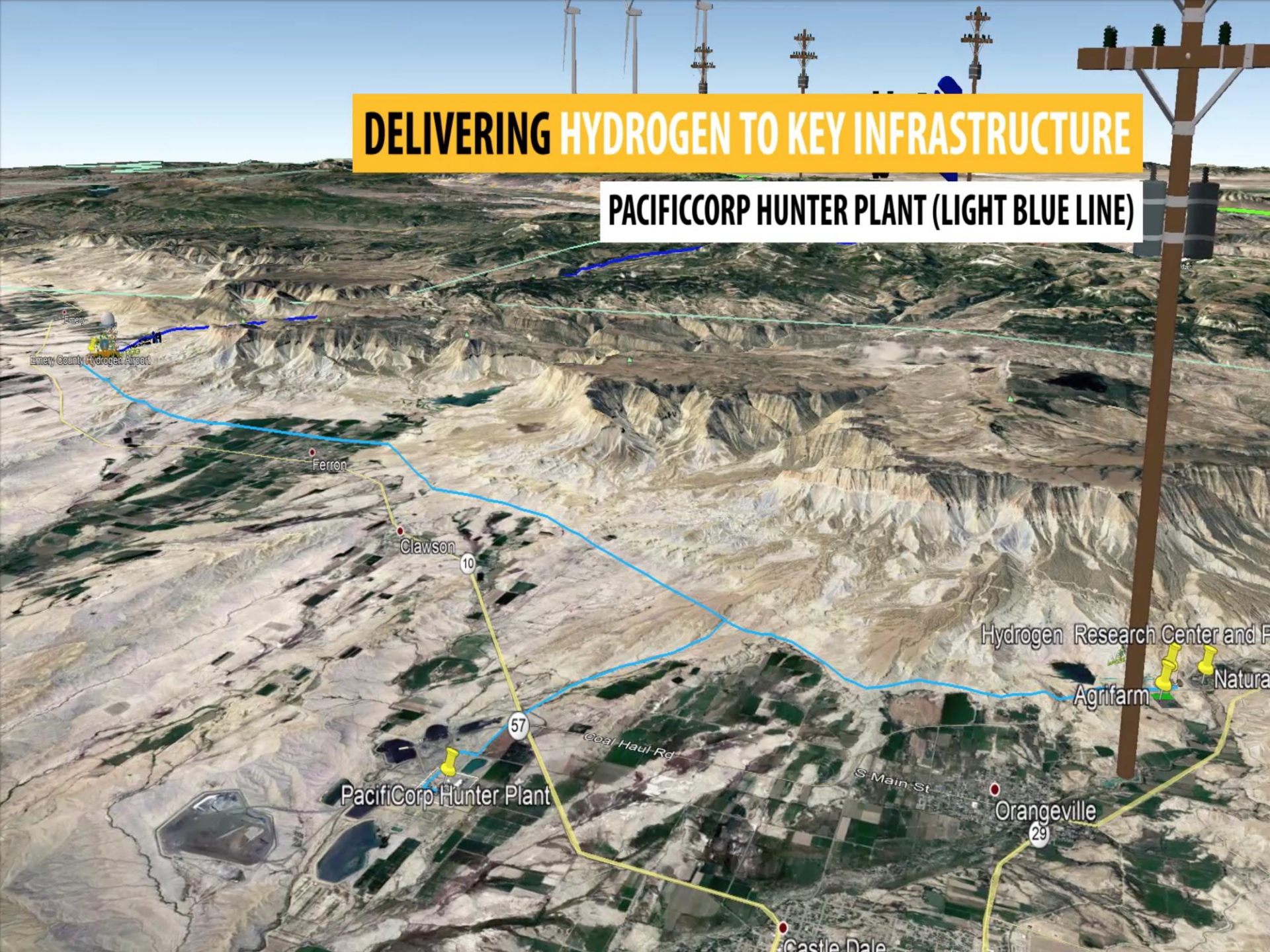
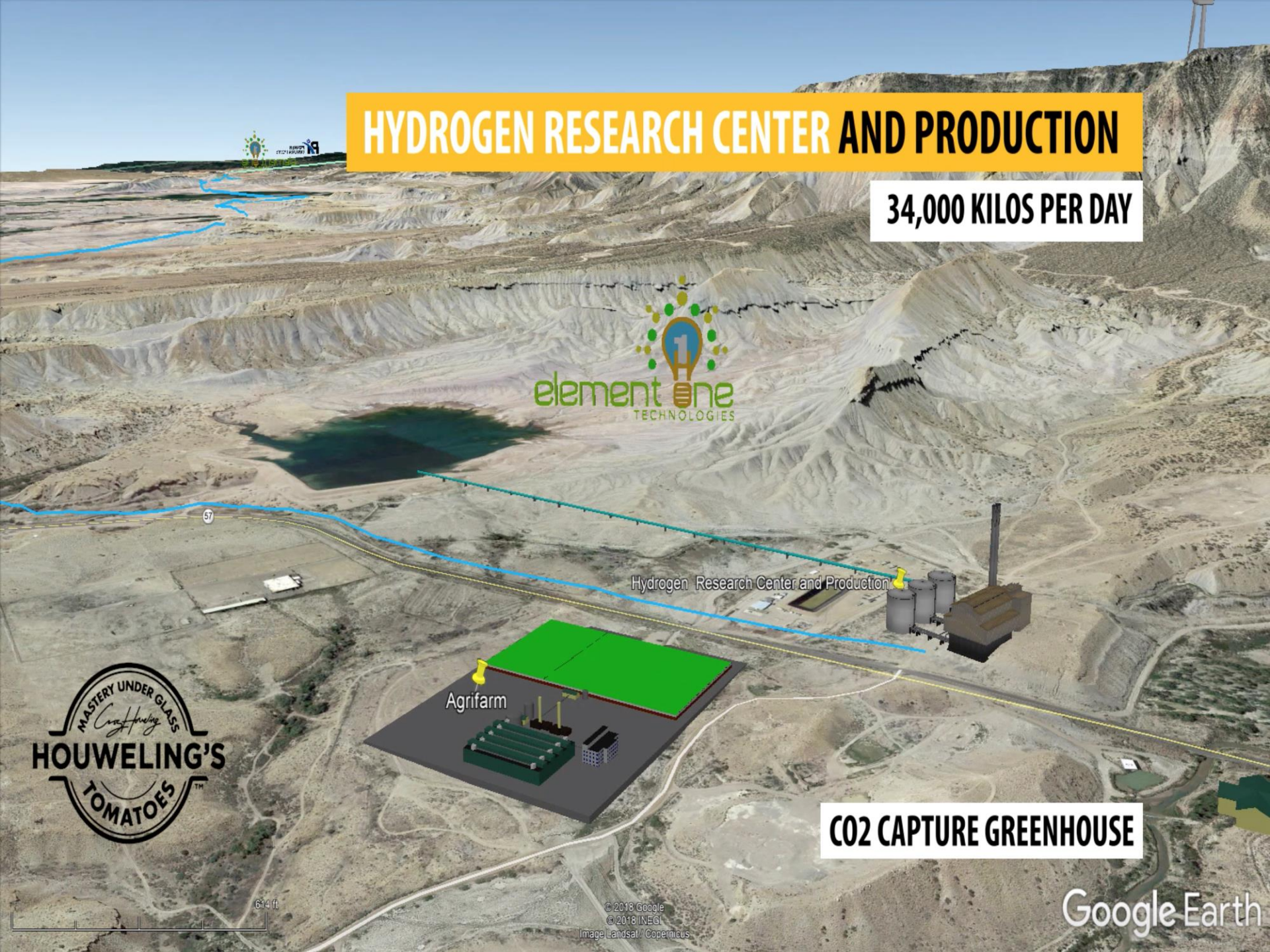
TECHNOLOGIES
Emery County Hydrogen Airport
801
Ranch Rd
10
EMERY COUNTY HYDROGEN AIRPORT PROPOSED
FUEL DELIVERY VIA PIPELINE [LIGHT BLUE]


DELIVERING HYDROGEN TO KEY INFRASTRUCTURE
PACIFICCORP HUNTER PLANT (LIGHT BLUE LINE)
Emery
Emery County Hydrogen Airport
Ferron
Clawson
10
57
Coal Haul Rd
PacifiCorp Hunter Plant
S Main St
Orangeville
29
Hydrogen Research Center and
Agrifarm
Natura


PROPOSED HYDROGEN PIPELINE DARK BLUE LINE
EMERY COUNTY HYDROGEN TRANSPORT
American Fork
Hydrogen Powered Train
Provo Airport
MAGNUM
Development
6
191
Price
Utah
Huntington
Natural Gas Facility
Agrifarm
Hydrogen
Research Center
Castle Dale
PacifiCorp Hunter Pl
Gunnison
Dominion Energy
Fillmore
15
Salina
Emery County Hydrogen Airpo
50
Richfield


Tremonton Class 8 Semi Trucks and Car Hydrogen Station
EXPORTING UTAH HYDROGEN
Provo Airport
Hydrogen Powered Train
Cedar Mountain Solar Farm
Agrifarm
Cedar Mountain Wind Turbines
PacifiCorp Hunter Plant
Emery County Hydrogen Airport
Milford Wind Turbine field
UTAH HYDROGEN CORRIDOR GREEN LINE
DELIVERING UTAH'S HYDROGEN TO NV, CA
St. George Car Hydrogen Statio
St George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Hydrogen Research Center and Production
Agrifarm
MASTERY UNDER GLASS
HOUWELING'S
TOMATOES
CO2 CAPTURE GREENHOUSE
614 ft
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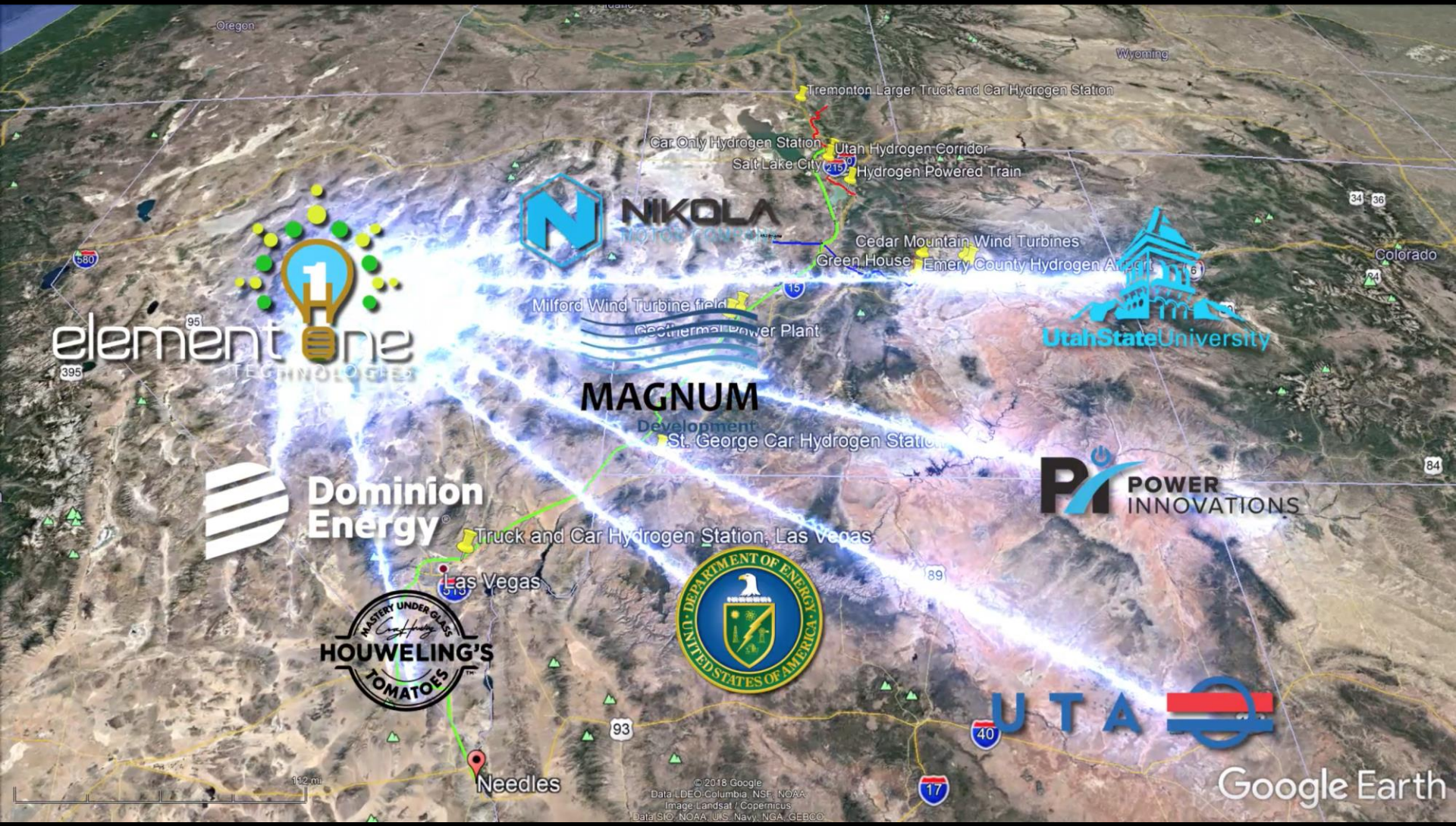
Google Earth


Oregon
Wyoming
Colorado
Tremonton Larger Truck and Car Hydrogen Station
Car Only Hydrogen Station
Utah Hydrogen Corridor
Salt Lake City
Hydrogen Powered Train
NIKOLA
Cedar Mountain Wind Turbines
Green House
Emery County Hydrogen
Milford Wind Turbine field
Geothermal Power Plant
element one
UtahStateUniversity
MAGNUM
Development
St. George Car Hydrogen Station
Dominion Energy
POWER INNOVATIONS
Truck and Car Hydrogen Station, Las Vegas
Las Vegas
HOUWELING'S TOMATOES
MASTERY UNDER GLASS
DEPARTMENT OF ENERGY
UNITED STATES OF AMERICA
UTA
Needles
112 mi
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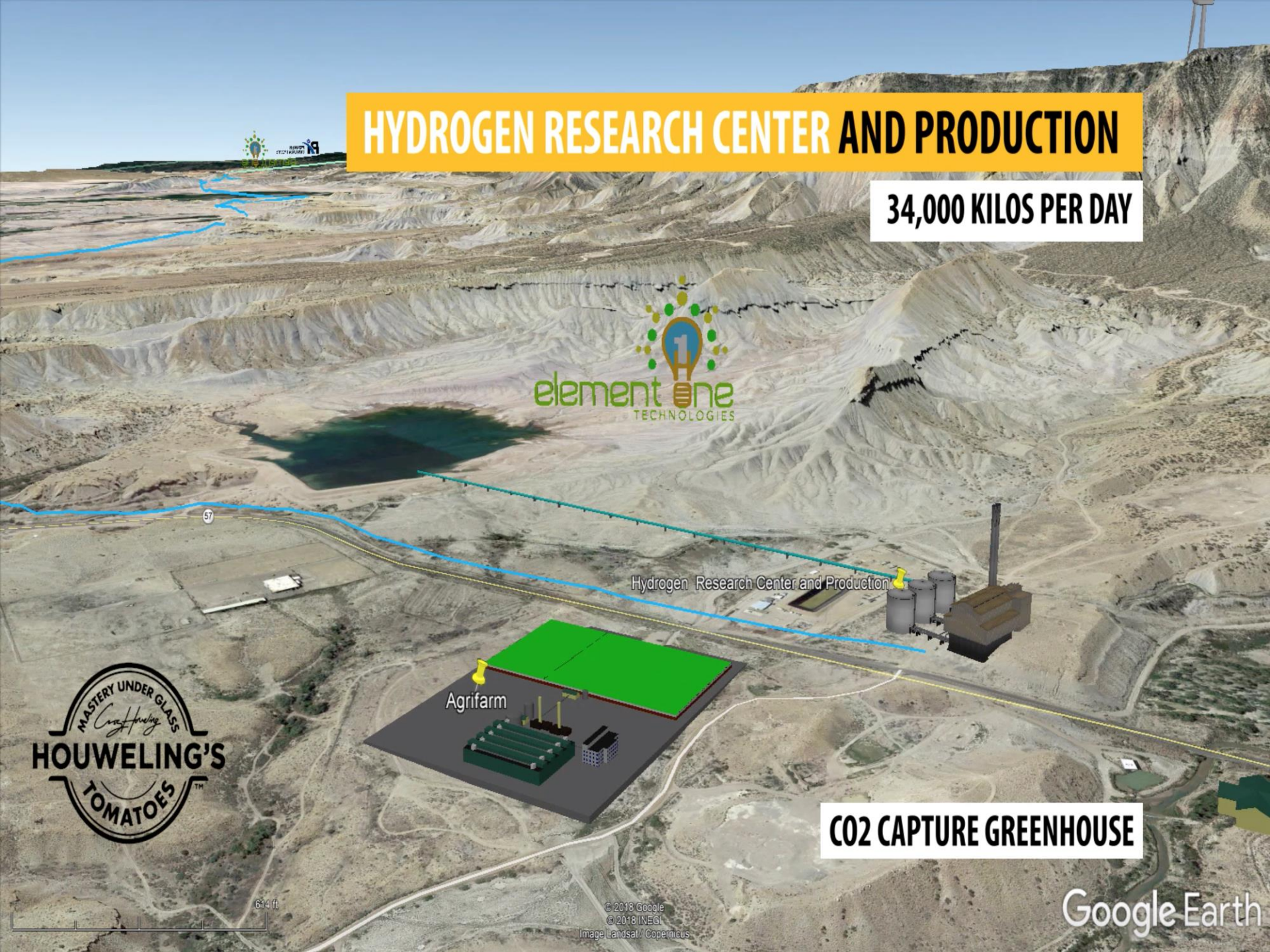
Data LDEO-Columbia, NSF, NOAA
Image Landsat / Copernicus
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Google Earth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