

# CHBC HES/RH2 SAG Call Agenda

April 12, 2024

## Summary:

- Mark Parrish, Bloom Energy presented on SoCalGas + Bloom H2 blending project at Caltech (presentation attached)
- Created task force to draft renewable hydrogen information page on CHBC website; if interested email CHBC staff.
- Will be seeking SAG support on policy initiatives.
- Will be seeking to develop set of core talking points about the value of RH2 that resonate with key audiences.

## Notes:

1. Welcome & Antitrust
2. Latest News & Updates
  - a. [Germany Commits €20 Billion to Hydrogen Fuel Network Amid Energy Transition](#)
  - b. [Bradford Council has approved a new hydrogen production facility in West Yorkshire](#)
  - c. [Opening of Australia's first dual-fuel gas and green hydrogen capable power plant in New South Wales](#)
  - d. [Germany earmarks up to \\$3.8 bln for future green hydrogen imports](#)
  - e. [Green hydrogen plans take shape for former Alcoa site at Cherry Point](#)
  - f. [Egypt, EU to cooperate across green hydrogen field](#)
  - g. [Underground Hydrogen Touted as Significant Clean Energy Resource in First U.S. Hearing](#)
  - h. [Chart, GasLog partner to develop liquid hydrogen shipping from Middle East](#)
  - i. [Department of Energy Announces \\$6 Billion to Transform America's Industrial Sector, Strengthen Domestic Manufacturing, and Slash Emissions](#)
  - j. [Nuvera reveals 30kW hydrogen-powered mobile power generator](#)
  - k. [FuelCell Energy and ExxonMobil Technology Extend Joint Development for Carbon Capture Innovation](#)
  - l. [Microsoft and Caterpillar collab on data center hydrogen fuel cell backup](#)
  - m. [Chevron announces its first solar-to-hydrogen production project in California's Central Valley](#)
  - n. [Republican-led Oklahoma legislature set to introduce subsidy for hydrogen projects after hub failed to win federal funding](#)
  - o. [Electric Hydrogen receives \\$18.3M transferable DOE tax credit for its gigafactory in Massachusetts, bringing total Department of Energy support to \\$65M](#)
  - p. [Verdogy recently won a \\$39.6 million grant from the Department of Energy \(DOE\). This grant marks a pivotal step towards revolutionizing green hydrogen production.](#)
  - q. [Nel ASA: Additional \\$41 Million in Tax Credits for Manufacturing Expansion in Michigan](#)
  - r. [Bloom Energy to receive up to US\\$75 million in federal tax credits for manufacturing plant](#)
  - s. Others
    - i. [ARPA-E Webinar: Quantitative monitoring of H2 emissions](#)
    - ii. [FuelCell Energy Technology to be Used in Sacramento Wastewater Biofuel Clean Energy Project](#)
  - t. Hydrogen Hubs
    - i. Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES) – CA-Regional Hydrogen Hub entity (LLC)
3. Project presentations

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- a. Mark Parrish, Director of Corporate Development – Bloom Energy: SoCalGas + Bloom H2 blending project at Caltech
  - i. Presentation attached
- b. Suggestions?
  - i. ACES, Delta, UT (LADWP/Chevron/Mitsubishi)
  - ii. GenHydro Lancaster project
  - iii. Dominion Enervue's metal-hydrogen project
  - iv. Mote hydrogen bioenergy project, Kern County and one in SMUD
  - v. Presentations of white paper sections for ARCHES
    1. Other relevant academic papers / whitepapers or reports (TBD)
  - vi. HyBlend
4. Regulatory/Legislative Updates and Calls to Action
  - a. Update from Jennifer
  - b. [CEC GFO-23-503 Feasibility of Underground Hydrogen Storage in California](#)
    - i. Workshop on April 17<sup>th</sup> 2pm PT
      1. Meeting ID: 851 3624 5451
      2. Meeting Password: 163060
    - ii. Applications due June 28<sup>th</sup>
  - c. [GFO-23-307 - Large-Scale Centralized Clean Hydrogen Production \(H2CENTRAL\)](#)
    - i. Applications due June 3<sup>rd</sup>
  - d. [Upcoming Clean Hydrogen Program Grant Funding Opportunity: H2ONSITE](#)
    - i. Anticipated release: May 2024
    - ii. Funding available: \$17M
  - e. CARB held Low Carbon Fuel Standard Workshop on April 10<sup>th</sup>
    - i. [Presentation](#)
  - f. Any CHBC policy initiatives for this SAG to support?
    - i. Possibly support [PFAS bill](#)
5. Current SAG Actions/Activities
  - a. Who/What/How Matrix
  - b. Renewable hydrogen information on CHBC website (global references)
    - i. Task force reviewing outline
6. Events
  - a. June 16-17<sup>th</sup> [California Hydrogen Leadership Summit](#) – Sheraton, Sacramento
    - i. Some sponsorship levels still available
    - ii. Value registration ends May 10; discount for CHBC members
  - b. See [Wednesday Weekly](#)
7. Open Discussion

## Attendees:

- Erika Marohn (CHBC)
- Leah Pillsbury (Ivys Inc)
- Martin Hering (Bosch)
- Alex Roberts (Oberon Fuels)
- Mark Parrish (Bloom Energy)
- Barron Effenberger (Caltrol)
- Cory Shumaker (CHBC)

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- Cristin Reno (Oberon Fuels)
- Deepak Aswani (SMUD)
- Don Boyajian (Plug Power)
- J Soltis (Marubeni)
- Jared Sayers (Azolla)
- Jen Capasso (Verdagy)
- Jennifer Hamilton (CHBC)
- Jim Cowboy (Element One Energy)
- Jimmy Apffel (Bloom Energy)
- Jose Lopez Gallego (Versallis)
- Katrina Fritz (CHBC)
- Mark Sheldon (Sheldon Research & Consulting)
- Mike McGowan (New Flyer)
- Peter Ogundele (GNA)
- Rick Gasaway (Green Stewardship LLC)
- Rudy De La Fuente (Industrial Gas Consultants)
- Rodrigo Sanchez (Deloitte)
- Scott Cameron (Sargent & Lundy)
- Tim Ransdell (SoCalGas)
- Travis Douglas (HyAxiom)





**Bloomenergy®**

## **Caltech SOEC Demo**

Prepared for CA Hydrogen Business Council

April 12, 2024

Bloomenergy

# Bloom Energy at a Glance



## MISSION

To make clean, reliable energy affordable for everyone in the world.



**>\$1.3B**

2023 Revenue



**~22B kWh**

Produced without combustion



**>1.2GW**

Deployed



**~1,200**

Installations



**\$12B**

Backlog

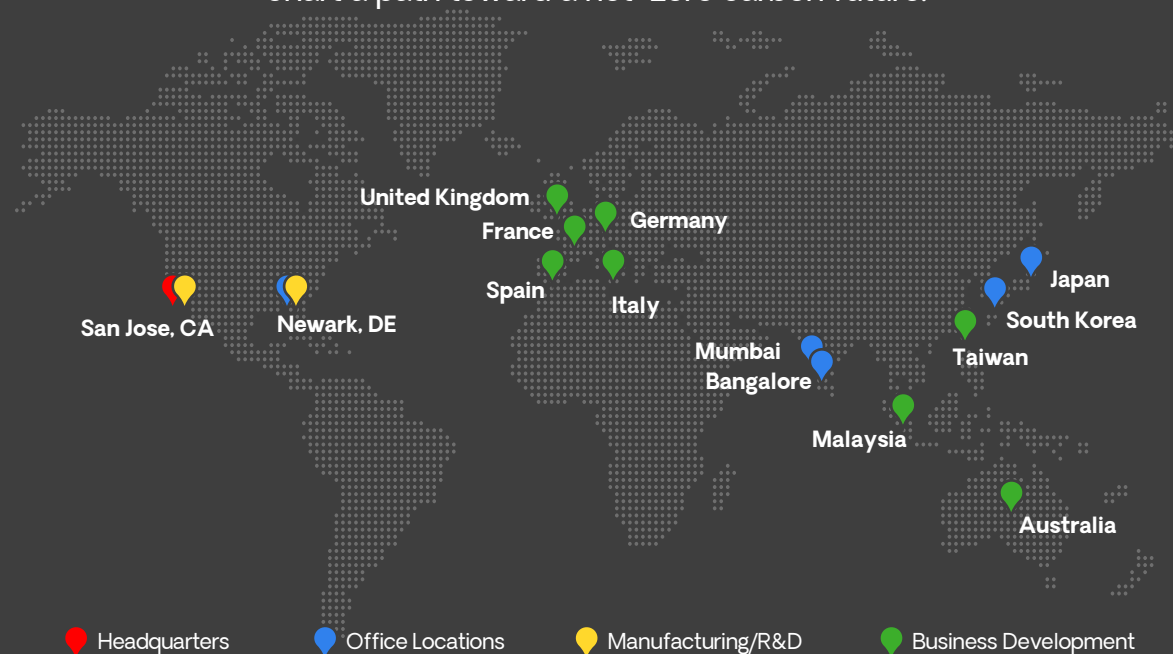


**>\$1bn**

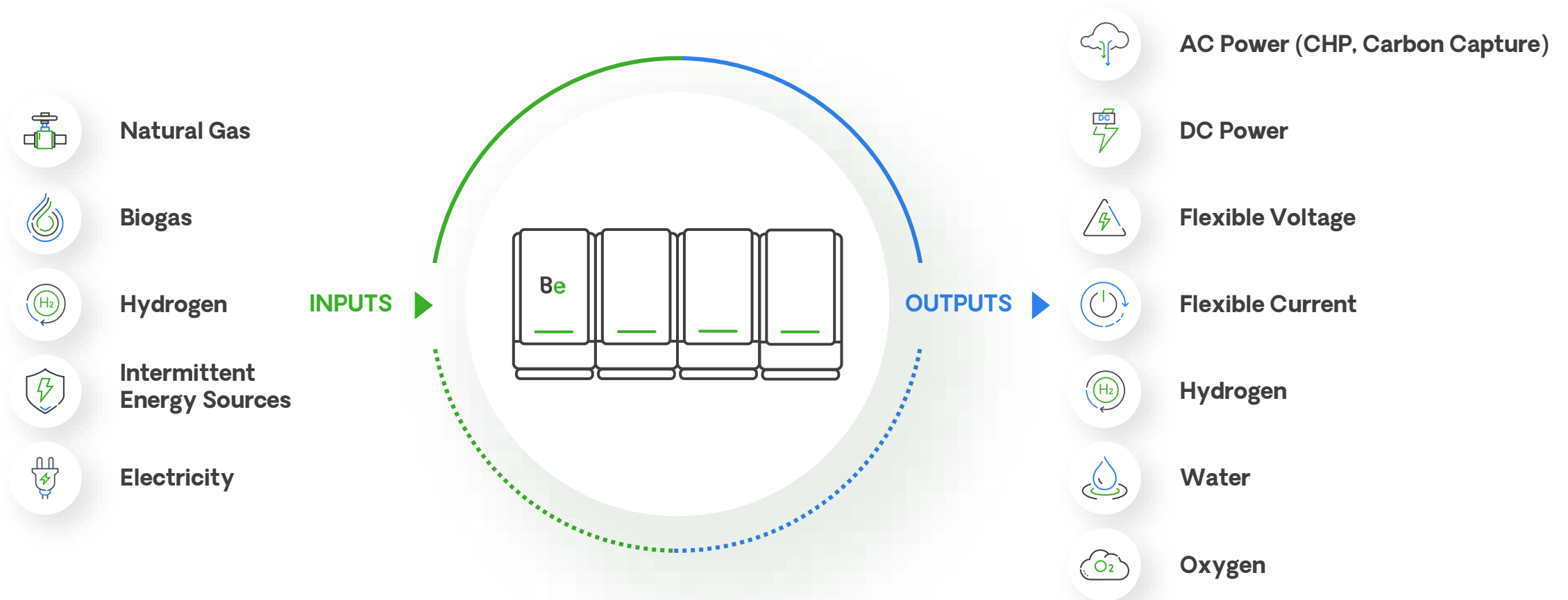
Cumulative R&D

## GLOBAL FOOTPRINT

Our corporate, manufacturing, and R&D offices serve as strategic global anchors to help organizations around the world reduce carbon emissions, enhance resiliency, and chart a path toward a net-zero carbon future.



# Flexible Platform Technology







Testing at INL

# Bloom's Solid Oxide Electrolyzer

## Record-Setting Efficiency



### Zero Carbon Electricity Is Critical for Hydrogen's Success

- ▼ Will consume ~60% of all renewables or ~ 70% of nuclear for today's production

- ▶ Energy efficiency is critical as electricity is the most significant cost driver



### Bloom's High Temperature Solid Oxide Electrolyzer

- ▶ The Bloom Electrolyzer is the most efficient electrolyzer tested by the DOE's Idaho National Lab (INL)

- ▶ Testing conducted for >7000 hours

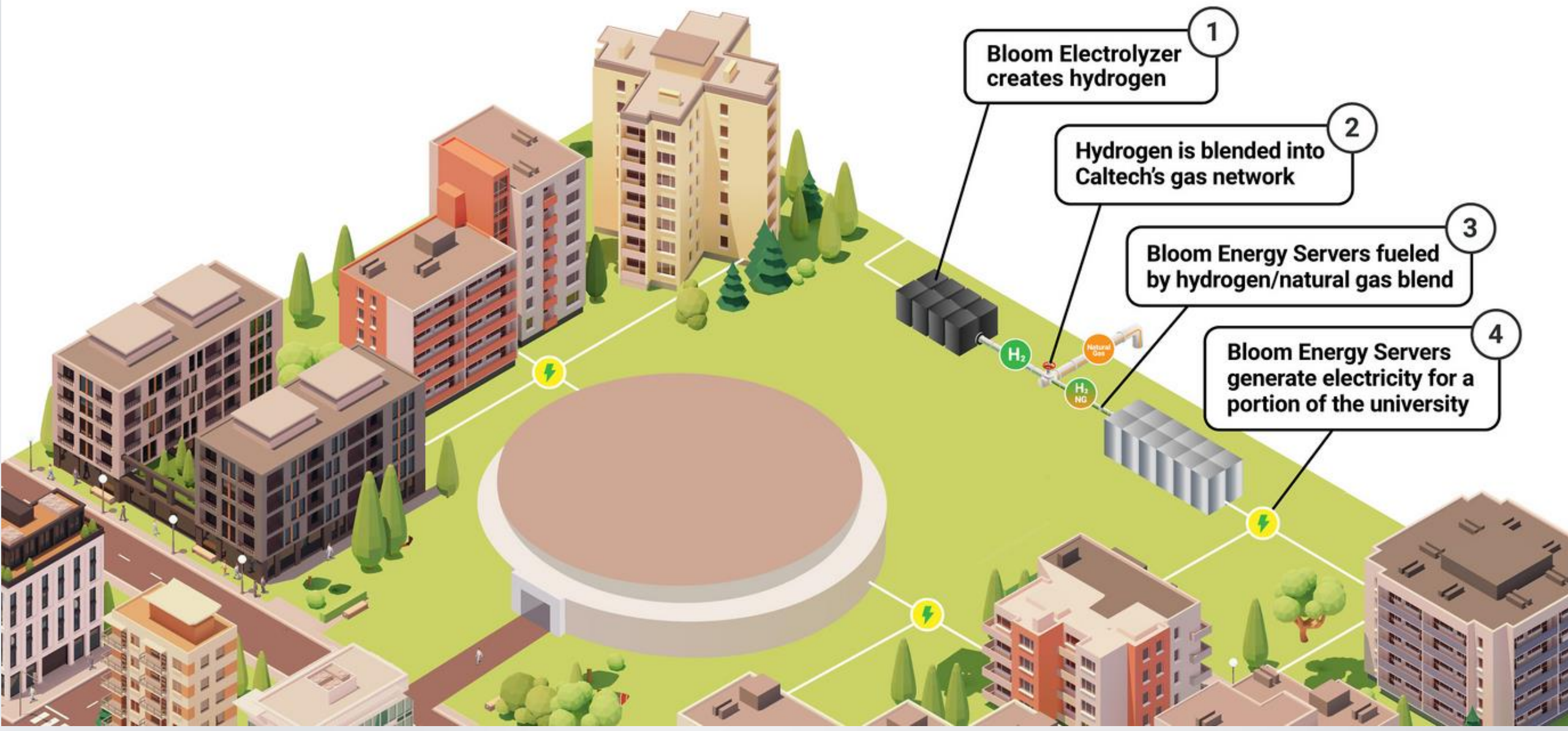
” The Bloom Electrolyzer is, without a doubt, the most efficient electrolyzer we have tested to-date at INL

John Wagner, Director, DOE Idaho National Labs.

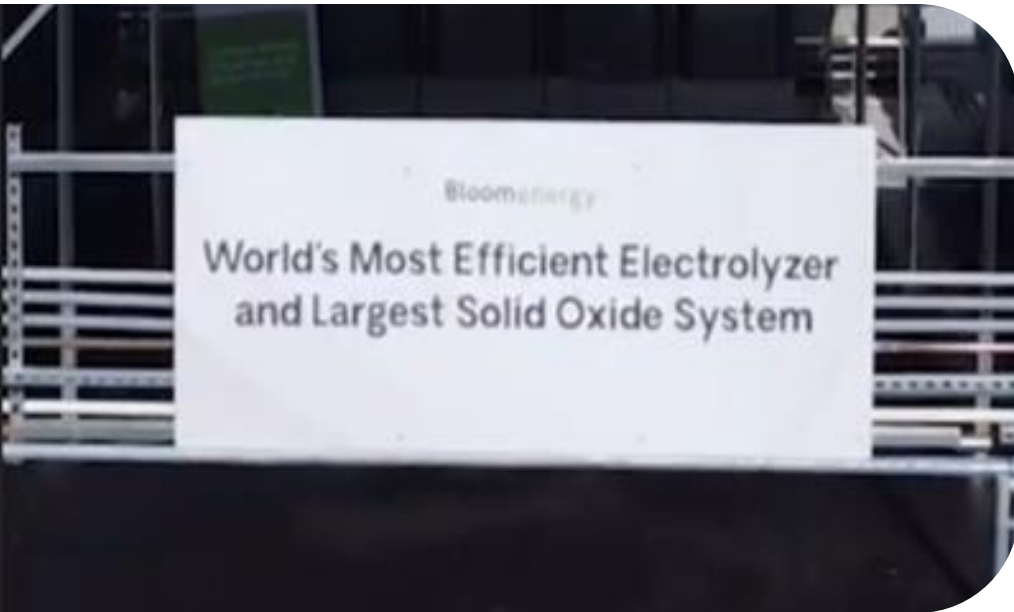
# POWERING A HYDROGEN FUTURE

Decarbonizing Natural Gas Infrastructure

Bloomenergy®







# Large Scale Demonstration Project

Ames Research Center, California, 4MW SOEC: >2.5 metric tons per day H<sub>2</sub> production



# Bloom SOEC Value Proposition & Differentiation

- ▶ High **system efficiency** – 37.5 kWh/kg H<sub>2</sub>
- ▶ **Scalability** -10 MW and 25 MW building blocks
- ▶ **2 GW of manufacturing capacity operating today** – Cells and Stacks (California), Assembly (Delaware/South Korea)
- ▶ Mature and accessible **supply chain** – no platinum, no iridium, established and scalable supply base
- ▶ **Bankable**: Over \$5B of Bloom solid oxide technology already financed; Strong balance sheet and supported by fuel cell business.
- ▶ **Performance** – Stack life – **multiple years** with **zero degradation** in capacity or efficiency
- ▶ **Resiliency** – swap out modules, **ease of maintenance**, maintain >99% availability

A wide-angle photograph of the San Francisco skyline under a clear blue sky. The city's dense collection of skyscrapers, including the Transamerica Pyramid and the Salesforce Tower, is visible. The text is overlaid on the upper half of the image.

Bloomenergy®

What  
Powers  
You