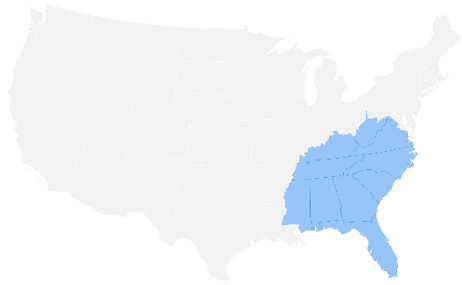


Hydrogen in the Southeast



Dr. Scott McWhorter

Board Chairman, SHEA

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President & CEO, Joule Consulting



Southeast Hydrogen Energy Alliance

Convening stakeholders to facilitate the commercialization of hydrogen energy technologies in the Southeast.

www.seh2.org

What is the purpose of SHEA?

SHEA's mission is to convene, educate and engage stakeholders and communities, providing outreach, education and networking opportunities to facilitate the adoption of hydrogen technologies throughout the southeast to achieve a zero carbon society

Outreach & Partnerships

To facilitate partnerships with regional universities, industry and research institutions on research and development grants related to H2 technologies



Knowledge Development

Identify and facilitate training for the next generation of hydrogen entrepreneurs and workforce participants as well as to engage and inform the public



Networking

Nonprofit and government organizational collaboration, i.e., networking with other regional energy organizations to inform, educate and provide outreach



Recruitment

Recruit new membership from large and small-medium companies and communities within the SE and engage them in regional hydrogen projects and partnerships



H₂ Advocacy

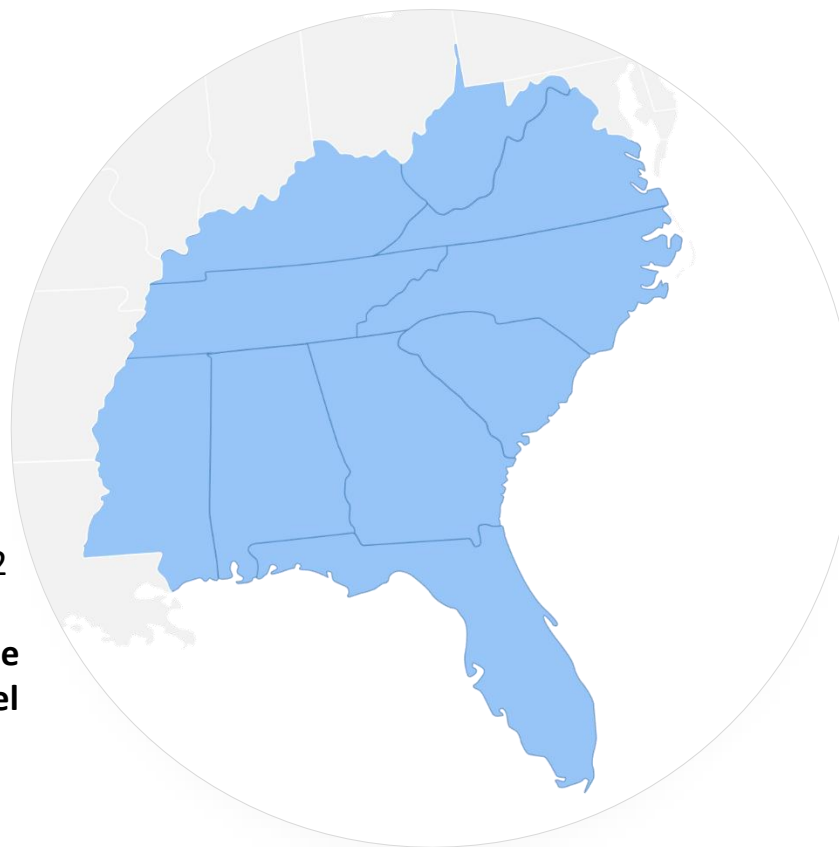
Provide representation of the regional hydrogen activities to DOE and other Federal agencies



About the Southeast Hydrogen Energy Alliance

- 2006 ● Organized as the South Carolina Hydrogen and Fuel Cell Alliance
- 2020 ● Reconstituted as Southeast Hydrogen Energy Alliance
- 2021 ● Commissioned SE Green H2 Supply Chain Study
- 2022 ● Southeast Clean H2 Hub Collaboration

- January 27 Orientation Conference
240+ registered
- February 2, 3, 4, 7 and 8 Working Groups 1 – 5 Workshops
Average 45/WG registered
 - 200+ organizations,
 - 400+ professionals,
 - 5 WGs, 12 WG Task Forces
- WGs Met as Required
 - 31 Multiple times total
- March 17 Consolidation Conference
 - Organizing SE H2 plan and Clean H2 RFI Response
- March 21 USDOE Clean H2 RFI Response
- April 2023 Released Membership Model



Board of Directors

Chairman: Scott McWhorter

Treasurer: Ted Motyka



Sarah Adair



Geovanni Castano



Darrell Scott



Thomas Koepe



Shawn Rossignol



John Ledbetter



Mark Johnson



Kevin Huang

SHEA – Understanding the SE

The Basis:

- **Identifying and Connecting the Southeast U.S. Green Hydrogen Energy Value Chain.** This study, which will be released in March of 2023, reviewed the green hydrogen supply chain in AL, FL, GA, NC, SC, TN and VA.
- **Energy Futures Initiative (EFI) Workshop on the Potential for Clean Hydrogen in the Carolinas.** This workshop, held October 28-29, 2021, focused on the potential for a green hydrogen hub in the Carolinas and surrounding region.
- **Creating a Southeast Hydrogen Energy Economy – Regional H2 Hub Plan.** Building on the green supply chain analysis and EFI workshop discussion, SHEA convened >400 individual stakeholders from 9 states for 31 workshops between January 27 and March 17 to initiate the process to define the vision for a regional clean hydrogen hub.

SHEA – H2 Hub Workshop Working Groups and Champions

Working Group 1: Creating the Community, NGO, Policy & Government Working Group – CO-CHAMPIONS: Sarah Adair (Duke Energy), Comas Haynes (GTRI), Sarah Degnan (Duke Energy)

Working Group 2: Creating The Production, Delivery and Storage Working Group – CO-CHAMPIONS: Sarah Adair (Duke Energy), Thomas Koeppe (Siemens Energy), Dr. James Fenton (University of Central Florida)

Working Group 3: Creating the Logistics Technology Working Group – CO-CHAMPIONS: John Ledbetter (Summit Works), Dr. Mark Johnson (Clemson University), Sameer Parvathikar (RTI International), David Dayton (RTI International)

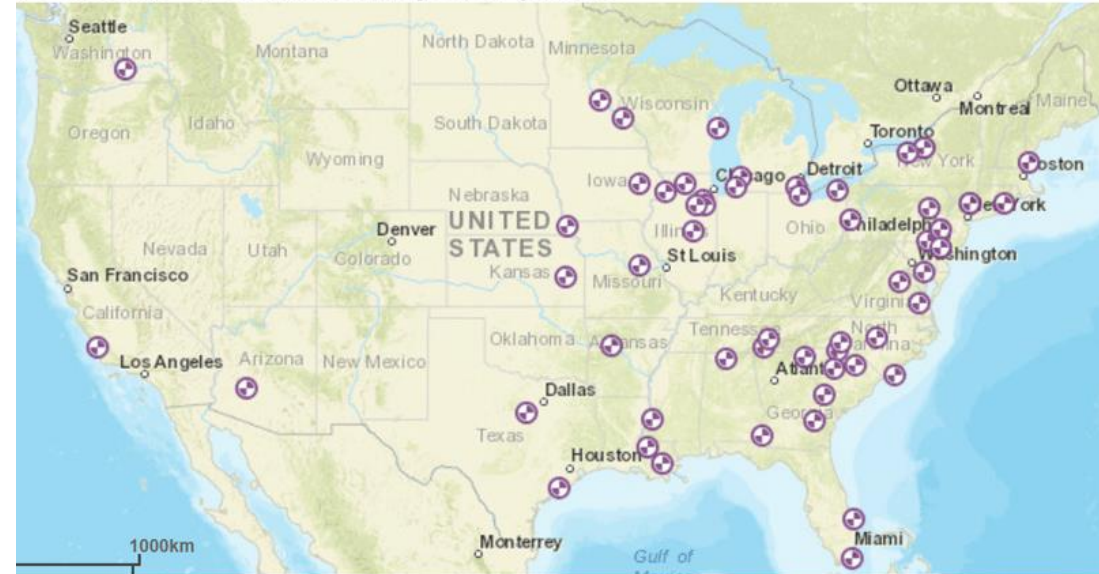
Working Group 4: Creating the Consuming Technology Working Group – CO-CHAMPIONS: Sarah Adair (Duke Energy), Thomas Koeppe (Siemens Energy), Peter Hoeflich (Duke Energy), and Dr. James Fenton (University of Central Florida)

Working Group 5: Creating the Safety, Codes and Standards Working Group – CHAMPION: Will James, (Savannah River National Laboratory)

Unique Characteristics of the Southeast:

- Proven Renewables - solar, hydropower, growing wind potential
- Solar capacity in the SE in 2020 was 12,696 MW, and is expected to more than double to 27,500 MW by the end of 2024
- Tremendous nuclear capacity – 269 Million MWhrs, 6 of the top 10 nuclear generators are in the SHEA region
 - Resulting in the Nation's lowest energy prices
- 3.96B GDP (20+% of U.S.)
- Approximately 85M population (1/4 of the U.S.)

Locations of U.S. nuclear power plants



Source: U.S. Energy Information Administration, U.S. Energy Mapping System, April 2020



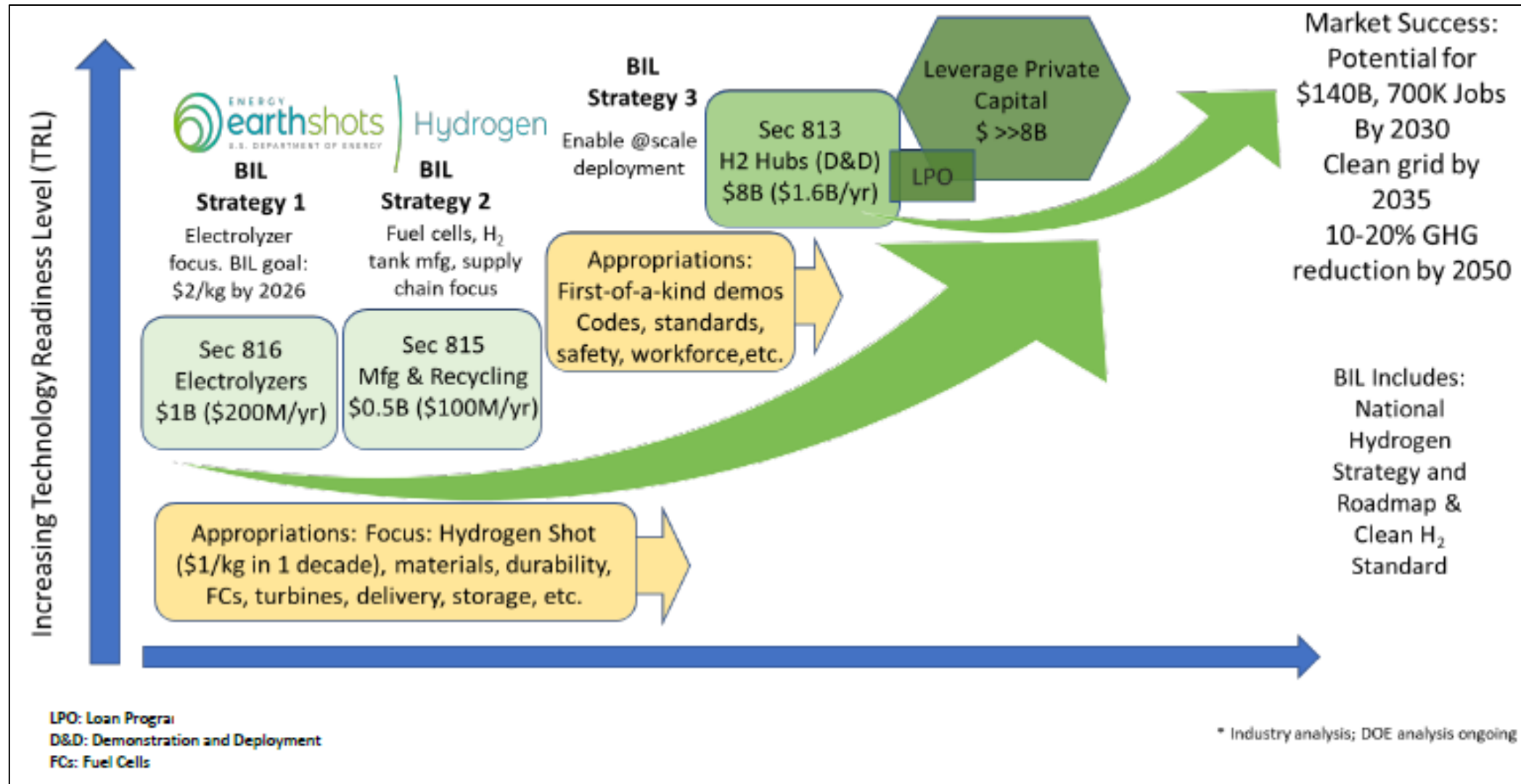
Unique Characteristics of the Southeast:

- Unique natural gas and fossil pipelines (gateway to the NE)
- Major U.S. Ports, inland ports, largest rail system in the U.S., interstate corridors
- 5 of the U.S. Largest Utility providers (Dominion, Duke Energy, NextEra, Southern Co, TVA)
- 4 DOE National Laboratories (JLab, NETL, ORNL, SRNL) plus 4 major NASA sites and over 85 military sites (22 major installations)
- 16 of the Top U.S. Colleges of Engineering in the SE
- Largest concentration of HBCU's and MSI in the country



Understanding the BIL and Hydrogen Hubs

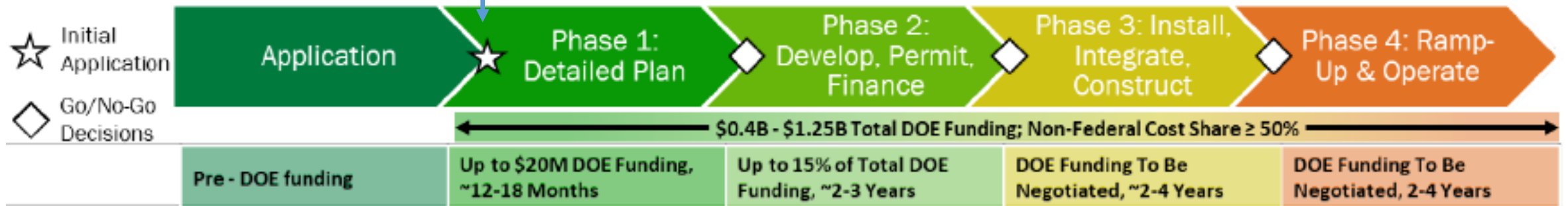
DOE's Strategy to Implement BIL



H2 Hubs Launch Strategy

Full Proposals submitted on April 7, 2023

Selections expected by Fall 2023



H2 Hubs Phase 1 Activities

- **Business Development and Management:** Define Market, feedstock, and offtakers; LOCs; final site selections; financial model; updated BP, MP, FP
- **Engineering, Procurement, Construction & Operations:** 30% Engineering and Design; Performance Model; TRL uncertainty analysis; IPS; Class 3 Total Project Cost estimate
- **Safety, Security & Regulatory Requirements:** Initial Safety Plans; Cybersecurity Plans; Environmental Information Volume
- **Risk Analysis and Mitigation:** Risk Management Plan; Risk Register updates
- **Technical Data & Analysis:** Updated TEA; Updated LCA
- **Community Benefits Plan:** Implement Phase I Scope; Update CBP for future Phases from lessons learned through community engagements and negotiations

Hub Teams in the SE:

Southeast Hydrogen Hub



Battelle Prime with:

- Duke Energy
- Dominion Energy
- Southern Company
- TVA
- Louisville G&E and Kentucky Utilities Co.

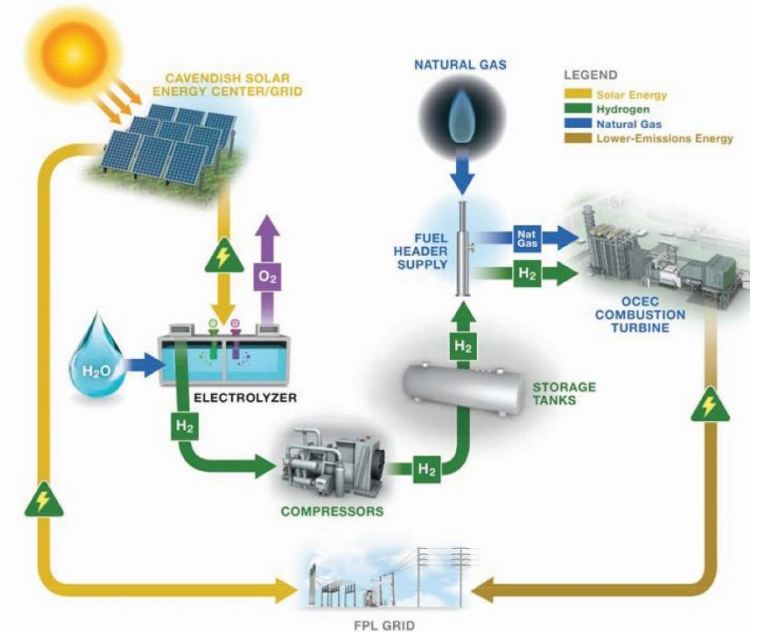
Tampa Electric and partners ??

- Were encouraged but no announcements of submittal

> \$5B of investment from non-federal resources

Hydrogen Hubs in the SE will focus on:

- Heavy-duty transportation
- Major transportation corridors
- Major industrial ports
- Robust energy-intensive industrial base
- Power generation and resiliency (H₂ microgrids)



Cavendish Nextgen Hydrogen Hub

- NextEra/FPL
- Okeechobee Clean Energy Center H₂ Pilot Project
- Extends into GA and AL

Other Programs to Watch in the SE:

- East Coast Commercial ZEV Corridor Freight Corridor Planning Project – awarded to CalStart to create a MHD freight corridor from GA to NJ; including hydrogen station planning along with electric charging
- Clean Energy Electrolysis and Manufacturing and Recycling HFTO Opportunity – proposals due in July 19
 - Will drastically drive down the cost of electrolyzer manufacturing, components and fuel cells
- Clean Hydrogen Tax Credits (IRA) – Section 48C: Application phase for initial \$4B opens on May 31, 2023 and closes July 31, 2023
- DOT Charging and Fueling Infrastructure Grant Program – provides \$2.5B over 4 years for EV and H2 charging infrastructure; due May 30, 2023
- Department of Commerce, Economic Development Administration Regional Technology and Innovation Hubs – 5 regional Tech Hubs will be selected during 1st Qtr FY24
 - Could be used to address workforce, education and training and innovation in regions for the next 10 years

Private Investment to Scale H2 in the SE:



Hyundai \$5B investment in Bryan County, GA

The Most Valuable U.S. Power Company Is Making a Huge Bet on Hydrogen – NextEra could invest \$20B in H2 - THE WALL STREET JOURNAL



Plug Power 15-ton/day \$100M in GA

Bosch \$200M Fuel Cell manufacturing in Anderson, SC

