Van Ness Feldman

Southern Gas Association Natural Gas Expo and Conference Panel: Hydrogen Policy & Regulation

Shannon Angielski Principal, Van Ness Feldman President, Clean Hydrogen Future Coalition October 20, 2021

Van Ness Feldman ...

Leaders in Climate & Energy

For over 40 years, Van Ness Feldman has been assisting clients in navigating the complex intersection of business and government in the field of energy, environment and natural resources.

Consistently acknowledged as being home to premier climate change, energy, and government advocacy practices in the United States, Van Ness Feldman's attorneys, technical consultants, and policy professionals provide a full suite of policy, regulatory, project development, permitting, transactional, and strategic services to a diverse cross-section of clients and industries most likely to be directly and significantly affected by the transitioning energy market.



C FC

Van Ness Feldman ... C FC Clean Hydrogen Future Coalition - Members



174 Power Global American Gas Association American Public Gas Association Bayotech bp **California Fuel Cell Partnership** Chevron **ClearPath Action Duke Energy EN Engineering Energy Infrastructure Council**

Engie **Gas Technology Institute GE Gas Power** Int'l Brotherhood of Boilermakers Int'l Brotherhood of Electrical Workers INGAA LanzaTech Linde Nikola North America's Building Trades Union North Slope Borough **Nuclear Energy Institute**

ONE Gas Sempra Energy **Siemens Energy Southern Company Tennessee Valley Authority** U. of Wyoming School of Energy **Resources UND Energy & Environmental Research** Center Voice of the Arctic Inupiat Wabash Valley Resources Williams Companies

Van Ness Feldman ... CHFC Foundational Principles C

- 1) Clean hydrogen is a critical pathway to achieve U.S. decarbonization objectives.
- 2) Investments in the full value chain of clean hydrogen production, transport and delivery, storage and use, as well as the infrastructure across multiple sectors, will be necessary to scale clean hydrogen in the U.S.
- 3) Policies designed to stimulate clean hydrogen production and use throughout the U.S. economy should be fuel agnostic and technology neutral, with a focus on achieving near-net zero CO₂ hydrogen production.
- 4) Skilled labor and the use of existing infrastructure are essential to the deployment of clean hydrogen throughout our economy.

Van Ness Feldman ... Administration Support - DOE C FC

EarthShot

- DOE's Hydrogen Program is hosting its first virtual Hydrogen Shot Summit on August 31 and September 1, 2021
- Two-day summit will bring together stakeholders from industry, research, academia, and government to identify pathways to meet DOE's Hydrogen Shot (\$1 per 1 kilogram in 1 decade)
- The summit will also feature breakout sessions covering multiple hydrogen production pathways and other topics, including:
 - Electrolysis
 - Thermal conversion with carbon capture and storage
 - Advanced pathways
 - Deployment and financing

Van Ness Feldman Administration Support - Budget C FC

Treasury Support in FY 2022 Budget Request

- Defines "low-carbon" hydrogen as hydrogen produced using zero-carbon emissions electricity and water as a feedstock, or hydrogen produced using natural gas as a feedstock and with all carbon emitted in the production process captured and sequestered. This definition appears to exclude biomass or gasification production methods.
- o 10-year PTC per kg of hydrogen produced for us in energy, industrial and transportation sectors.
- $\circ~$ Allows for direct pay option

DOE FY 2022 Budget Request

• Office of Fossil Energy and Carbon Management: \$890 million (\$140 million above FY 2021 enacted)

- CCUS and Power Systems: \$531.5 million (\$84.7 million above FY 2021 enacted)
- Natural Gas Technologies: \$130 million (\$73 million above FY 2021 enacted)

• Office of Energy Efficiency and Renewable Energy (EERE): \$4.73 billion (\$1.87 billion above FY 2021 enacted)

• Hydrogen and Fuel Cell Technologies: \$197.5 million (\$47.5 million above FY 2021 enacted)

Van NessCongressional Support:FeldmanHouse FY 2022 Energy-Water Appropriations Bill



Energy Efficiency and Renewable Energy

- Vehicle Technologies: \$530 million
 - Supertruck III: \$30 million
- Hydrogen and Fuel Cell Technologies: \$195 million
 - H2@Scale: \$100 million
 - Heavy-Duty Transportation and Industrial Applications of H2: \$114 million
 - Sustainable Aviation Applications of H2: \$70 million
 - Fuel Cell Technologies: \$30 million
 - Modeling and Characterization of Perovskites as Catalysts for Hydrogen Extraction: \$2.5 million
 - Office of Nuclear Energy Demonstration Project (costshare with EERE): \$15 million
 - Electrolyzer Development: \$14 million
 - Solar Fuels R&D for H2 Production: \$10 million
 - System Development and Integration \$60 million

Fossil Energy and Carbon Management

- Advanced Energy and Hydrogen Systems (CCUS and Power Systems): \$92 million
- Natural Gas Hydrogen Research (Natural Gas Technologies): \$20 million

Crosscutting Initiatives

Energy Storage – includes low-carbon hydrogen storage

Industrial Decarbonization

Hydrogen Energy and Fuel Cell Coordination

 Report directs DOE to coordinate efforts across EERE, FECM, NE, OE, and Science

Van Ness Feldman ... Senate FY 2022 Energy-Water Appropriations Bill



Energy Efficiency and Renewable Energy

- Vehicle Technologies: \$553.114 million
 - Supertruck III: \$40 million
- Hydrogen and Fuel Cell Technologies: \$200
 million
 - H2@Scale: \$100 million
 - Heavy-Duty Transportation and Industrial Applications of H2: \$60 million
 - Hydrogen Technologies: \$45 million
 - Safety, Codes, and Standards: \$10 million

Fossil Energy and Carbon Management

- Solid Oxide Fuel Cells & Hydrogen: \$90 million
- Advanced Energy and Hydrogen Systems (CCUS and Power Systems): \$75 million
- Natural Gas Hydrogen Research (Natural Gas Technologies): \$20 million – includes \$5 million for demo project focused on H2 production from processing of produced water and mineral substances

Crosscutting Initiatives

Energy Storage – includes low-carbon hydrogen storage

Industrial Decarbonization

Hydrogen Energy and Fuel Cell Coordination

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Van Ness
FeldmanBipartisan Energy Infrastructure
Package - Hydrogen Provisions



- Includes an R&D program, \$8B for clean hydrogen hubs, \$500 million for clean hydrogen manufacturing and recycling, and \$1 billion for clean hydrogen electrolysis research, development, and deployment. Also includes revised clean hydrogen R&D program and national hydrogen roadmap requirement.
- Establishes clean hydrogen definition:
 - Carbon intensity equal to or less than 2 kg of CO₂-equivalent at the site of production per kg of H₂ produced
- Establishes Office of Clean Energy Demonstrations to oversee demo projects authorized under the bill or the Energy Act of 2020, as well as Regional Clean Hydrogen Hubs
- Includes surface transportation infrastructure legislation from Senate Environment and Public Works Committee, including:
 - Grant program for Alternative Fuel Corridors designed to strategically deploy alternative fueled vehicles, includes hydrogen refueling infrastructure

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FeldmanHydrogen Production Tax Credit
Legislation – Budget Reconciliation



Lifecycle GHG Emission	PTC \$Value per kg (% of credit)	ITC % Value (% of credit)
95 - 100%	\$3.00 (100%)	30% (100%)
85 – 95%	\$1.02 (34%)	10.2% (34%)
75 – 85 %	\$0.75 (25%)	7.5% (25%)
50 - 75%	\$0.60 (20%)	6% (20%)

- Creates an ITC and PTC for hydrogen production cannot claim both
- Credit value based on % reduction from conventional steam methane reforming carbon intensity
- Credit is per kg clean H₂ for 10 years from placed in service date, but is not guaranteed
- DOE and EPA to publish guidance on methods to determine LCA which includes upstream and downstream emissions
- Includes ability to generate hydrogen from grid electricity by using environmental attributes
- Includes prevailing wage and apprenticeship requirements
- Projects claiming 45Q or 45J tax credits do not qualify for the PTC, but projects claiming Section 45 or 48 renewable tax credits allowed to claim the tax credits

Van Ness Feldman ... Hydrogen Tax Legislation



- Clean Hydrogen Production Incentives Act (S. 1017) Sen. Martin Heinrich (D-NM)
 - Establishes PTĆ for hydrogen produced from renewable energy and nuclear resources (fossil with CCUS not eligible).
- Hydrogen Utilization and Sustainability Act (S. 1266) Sen. Young (R-IN) and Whitehouse (D-RI)
 - Adds qualified hydrogen as a qualifying resource in Section 45 to qualify for the existing clean electricity production tax credit
- Energy Sector Innovation Credit Act Sens. Mike Crapo (R-ID) and Sheldon Whitehouse (D-RI)
 - Creates a clean hydrogen PTC based on average wholesale price of a kilogram of hydrogen in the prior calendar year multiplied by the amount of clean hydrogen produced and sold to an unrelated person
 - Credit phases down and eventually phases out based on market penetration of technology

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Clean Hydrogen Deployment Act (Energy and Commerce Committee discussion draft)

- Establishes a DOE pilot program for which DOE would be required to select at least five projects to use low-emissions hydrogen and to provide annual payments to those projects based on the cost difference between the eligible clean hydrogen used and conventional hydrogen or other non-hydrogen fuel or feedstock.
- Clean Energy Hydrogen Innovation Act (H.R. 1788) Rep. Greg Pence (R-IN)
 - Amends eligibility for loan guarantees to include projects relating to hydrogen production, delivery, infrastructure, storage, fuel cells, and end uses.

Advancing the Clean Hydrogen Future Act (S. 2200) – Sen. Martin Heinrich (D-NM)

 Establishes electrolysis RD&D program with goal of reducing cost of hydrogen produced via electrolysis to less than \$2/kg by 2026 – included in Senate Bipartisan infrastructure package





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