
XV. Project Listings by State

Alabama

- IV.E.1 University of Alabama: Novel Carbon(C)-Boron(B)-Nitrogen(N)-Containing H₂ Storage Materials IV-105
- IV.F.3 Toray Composites America: Synergistically Enhanced Materials and Design Parameters for Reducing the Cost of Hydrogen Storage Tanks IV-131

Arizona

- II.G.1 University of Arizona: Semiconductor Nanorod/Metal(Metal Oxide) Hybrid Materials: Characterization of Frontier Orbital Energies and Charge Injection Processes Using Unique Combinations of Photoemission Spectroscopies and Waveguide Spectroelectrochemistris II-85
- II.G.5 Arizona State: Electrochemical Characterization of the Oxygen-Tolerant Soluble Hydrogenase I from *Pyrococcus furiosus*. II-97
- II.G.13 University of Arizona: Center for Interface Science: Solar-Electric Materials (CISSEM) II-123
- II.G.16 Arizona State: Artificial Hydrogenases: Utilization of Redox Non-Innocent Ligands in Iron Complexes for Hydrogen Production II-131
- VIII.3 Custom Sensor Solutions: Hydrogen Safety, Codes and Standards: Sensors VIII-16

California

- II.C.2 Sandia National Laboratories: Solar Hydrogen Production with a Metal Oxide-Based Thermochemical Cycle II-39
- II.D.3 Lawrence Livermore National Laboratory: Characterization and Optimization of Photoelectrode Surfaces for Solar-to-Chemical Fuel Conversion II-58
- II.E.1 University of California, Berkeley: Maximizing Light Utilization Efficiency and Hydrogen Production in Microalgal Cultures II-63
- II.F.1 Sacramento Municipal Utility District : Bio-Fueled Solid Oxide Fuel Cells II-81
- II.G.10 Lawrence Berkeley National Laboratory: Joint Center for Artificial Photosynthesis: An Overview II-111
- II.G.11 Lawrence Berkeley National Laboratory: Joint Center for Artificial Photosynthesis: Corrosion Protection Schemes to Enable Durable Solar Water Splitting Devices. II-115
- II.G.12 Caltech: Joint Center for Artificial Photosynthesis: High Throughput Experimentation for Electrocatalyst and Photoabsorber Discovery II-119
- II.G.15 Stanford University: Center on Nanostructuring for Efficient Energy Conversion (CNEEC) II-128
- II.G.17 Caltech: Joint Center for Artificial Photosynthesis: Benchmarking Electrocatalysts for the Oxygen Evolution Reaction II-134
- II.G.18 Caltech: Joint Center for Artificial Photosynthesis: Si Microwire-Based Solar Water Splitting Devices II-137
- II.G.20 Lawrence Berkeley National Laboratory: Joint Center for Artificial Photosynthesis: Modeling and Simulation Team II-144
- III.5 Sandia National Laboratories: Hydrogen Embrittlement of Structural Steels III-31
- III.7 Ben C. Gerwick Inc.: Vessel Design and Fabrication Technology for Stationary High-Pressure Hydrogen Storage. III-39
- III.8 Lawrence Livermore National Laboratory: Preliminary Testing of LLNL/Linde 875-bar Liquid Hydrogen Pump III-45
- III.8 Linde LLC: Preliminary Testing of LLNL/Linde 875-bar Liquid Hydrogen Pump III-45
- III.9 HyGen Industries: Development of a Centrifugal Hydrogen Pipeline Gas Compressor III-49
- IV.B.1 Jet Propulsion Laboratory: Hydrogen Storage Engineering Center of Excellence IV-22
- IV.B.1 California Institute of Technology: Hydrogen Storage Engineering Center of Excellence IV-22
- IV.C.1 H₂ Technology Consulting LLC: Hydrogen Sorbent Measurement Qualification and Characterization IV-68

XV. Project Listings by State

California (Continued)

IV.C.2	Lawrence Berkeley National Laboratory: Hydrogen Storage in Metal-Organic Frameworks	IV-73
IV.D.1	University of California, Los Angeles: Design of Novel Multi-Component Metal Hydride-Based Mixtures for Hydrogen Storage	IV-92
IV.F.4	Lawrence Livermore National Laboratory: Thermomechanical Cycling of Thin-Liner High-Fiber-Fraction Cryogenic Pressure Vessels Rapidly Refueled a by LH2 pump to 700 bar	IV-136
IV.F.4	Linde LLC: Thermomechanical Cycling of Thin-Liner High-Fiber-Fraction Cryogenic Pressure Vessels Rapidly Refueled a by LH2 pump to 700 bar	IV-136
IV.F.4	Spencer Composites Corporation: Thermomechanical Cycling of Thin-Liner High-Fiber-Fraction Cryogenic Pressure Vessels Rapidly Refueled a by LH2 pump to 700 bar	IV-136
V.D.1	Lawrence Berkeley National Laboratory: High-Performance, Durable, Low-Cost Membrane Electrode Assemblies for Transportation Applications	V-95
V.E.1	Lawrence Berkeley National Laboratory: Durability Improvements through Degradation Mechanism Studies	V-105
V.E.2	Lawrence Berkeley National Laboratory: Accelerated Testing Validation	V-111
V.G.1	Lawrence Berkeley National Laboratory: Fuel Cell Fundamentals at Low and Subzero Temperatures	V-140
V.H.2	Electricore, Inc.: Roots Air Management System with Integrated Expander	V-162
V.I.5	University of California, Irvine: Enlarging the Potential Market for Stationary Fuel Cells through System Design Optimization	V-190
V.I.7	Lawrence Berkeley National Laboratory: A Total Cost of Ownership Model for PEM Fuel Cells in Combined Heat and Power and Backup Power Applications	V-196
V.I.7	University of California, Berkeley: A Total Cost of Ownership Model for PEM Fuel Cells in Combined Heat and Power and Backup Power Applications	V-196
VI.3	Quantum Fuel Systems Technologies Worldwide, Inc.: Development of Advanced Manufacturing Technologies for Low-Cost Hydrogen Storage Vessels	VI-15
VII.9	California Air Resources Board: Data Collection and Validation of Newport Beach Hydrogen Station Performance	VII-46
VII.9	Hydrogenics Corporation: Data Collection and Validation of Newport Beach Hydrogen Station Performance	VII-46
VII.10	California State University, Los Angeles: California State University Los Angeles Hydrogen Refueling Facility Performance Evaluation and Optimization	VII-49
VII.11	Linde LLC: Performance Evaluation of Delivered Hydrogen Fueling Stations	VII-52
VII.12	Sandia National Laboratories: Hydrogen Fueling Infrastructure Research and Station Technology	VII-57
VII.15	California Fuel Cell Partnership: H2-FCEV Commercialization - Facilitating Collaboration, Obtaining Real World Expertise, and Developing New Analysis Tools	VII-66
VIII.3	Lawrence Livermore National Laboratory: Hydrogen Safety, Codes and Standards: Sensors	VIII-16
VIII.4	Sandia National Laboratories: R&D for Safety, Codes and Standards: Materials and Components Compatibility	VIII-23
VIII.6	Sandia National Laboratories: R&D for Safety Codes and Standards: Hydrogen Release Behavior and Risk Assessment	VIII-34
VIII.7	California Fuel Cell Partnership: Hydrogen Emergency Response Training for First Responders	VIII-40
VIII.8	Fluer, Inc.: Hydrogen Safety Panel and Hydrogen Safety Knowledge Tools	VIII-43
VIII.8	City of Santa Fe Springs: Hydrogen Safety Panel and Hydrogen Safety Knowledge Tools	VIII-43
VIII.10	Lawrence Livermore National Laboratory: Hands-on Hydrogen Safety Training	VIII-54
IX.5	Sandia National Laboratories: Maritime Fuel Cell Generator Project	IX-23
X.8	University of California, Irvine: Tri-Generation Fuel Cell Technologies for Location-Specific Applications	X-44

Colorado

II.B.1	National Renewable Energy Laboratory: Renewable Electrolysis Integrated Systems Development and Testing	II-17
II.B.1	Spectrum Automation Controls: Renewable Electrolysis Integrated Systems Development and Testing	II-17
II.B.4	National Renewable Energy Laboratory: High-Performance, Long-Lifetime Catalysts for Proton Exchange Membrane Electrolysis	II-28
II.C.1	University of Colorado, Boulder: Solar-Thermal Redox-Based Water Splitting Cycles.	II-33
II.C.2	University of Colorado, Boulder: Solar Hydrogen Production with a Metal Oxide-Based Thermochemical Cycle.	II-39
II.C.2	Colorado School of Mines: Solar Hydrogen Production with a Metal Oxide-Based Thermochemical Cycle	II-39
II.D.1	National Renewable Energy Laboratory: Semiconductor Materials for Photoelectrolysis.	II-48
II.D.2	National Renewable Energy Laboratory: Critical Research for Cost-Effective Photoelectrochemical Production of Hydrogen	II-53
II.E.2	National Renewable Energy Laboratory: Biological Systems for Algal Hydrogen Photoproduction	II-67
II.E.3	National Renewable Energy Laboratory: Fermentation and Electrohydrogenic Approaches to Hydrogen Production	II-71
II.E.4	National Renewable Energy Laboratory: Probing O ₂ -Tolerant CBS Hydrogenase for Hydrogen Production	II-76
II.F.1	TDA Research: Bio-Fueled Solid Oxide Fuel Cells.	II-81
II.G.3	National Renewable Energy Laboratory: Oxidatively Stable Nanoporous Silicon Photocathodes for Photoelectrochemical Hydrogen Evolution	II-92
II.G.7	National Renewable Energy Laboratory: Photobiohybrid Solar Fuels	II-103
II.G.14	National Renewable Energy Laboratory: Photobiohybrid Solar Fuels Nanoparticle-Hydrogenase Complexes	II-125
III.11	National Renewable Energy Laboratory: 700-Bar Hydrogen Dispenser Hose Reliability Improvement	III-58
III.11	Spectrum Automation Controls: 700-Bar Hydrogen Dispenser Hose Reliability Improvement	III-58
IV.B.1	National Renewable Energy Laboratory: Hydrogen Storage Engineering Center of Excellence.	IV-22
IV.B.5	National Renewable Energy Laboratory: System Design, Analysis, Modeling, and Media Engineering Properties for Hydrogen Energy Storage.	IV-47
IV.C.1	National Renewable Energy Laboratory: Hydrogen Sorbent Measurement Qualification and Characterization.	IV-68
V.A.2	National Renewable Energy Laboratory: Extended, Continuous Pt Nanostructures in Thick, Dispersed Electrodes.	V-15
V.A.2	Colorado School of Mines: Extended, Continuous Pt Nanostructures in Thick, Dispersed Electrodes	V-15
V.A.6	National Renewable Energy Laboratory: Tungsten Oxide and Heteropoly Acid-Based System for Ultra-High Activity and Stability of Pt Catalysts in Proton Exchange Membrane Fuel Cell Cathodes.	V-36
V.A.6	Colorado School of Mines: Tungsten Oxide and Heteropoly Acid-Based System for Ultra-High Activity and Stability of Pt Catalysts in Proton Exchange Membrane Fuel Cell Cathodes	V-36
V.A.6	University of Colorado, Boulder: Tungsten Oxide and Heteropoly Acid-Based System for Ultra-High Activity and Stability of Pt Catalysts in Proton Exchange Membrane Fuel Cell Cathodes	V-36
V.C.2	Colorado School of Mines: Advanced Hybrid Membranes for Next Generation PEMFC Automotive Applications	V-87
V.C.2	National Renewable Energy Laboratory: Advanced Hybrid Membranes for Next Generation PEMFC Automotive Applications	V-87
V.E.3	National Renewable Energy Laboratory: Fuel Cell Technology Status—Cost and Price Status.	V-118
V.F.1	National Renewable Energy Laboratory: Effect of System Contaminants on PEMFC Performance and Durability	V-128
V.F.1	Colorado School of Mines: Effect of System Contaminants on PEMFC Performance and Durability	V-128

XV. Project Listings by State

Colorado (Continued)

V.I.5	National Renewable Energy Laboratory: Enlarging the Potential Market for Stationary Fuel Cells through System Design Optimization	V-190
V.L.1	National Renewable Energy Laboratory: Advanced Ionomers and MEAs for Alkaline Membrane Fuel Cells	V-211
V.L.1	Colorado School of Mines: Advanced Ionomers and MEAs for Alkaline Membrane Fuel Cells	V-211
V.M.1	National Renewable Energy Laboratory: Best Practices and Benchmark Activities for ORR Measurements by the Rotating Disk Electrode Technique	V-215
VI.1	National Renewable Energy Laboratory: Fuel Cell Membrane Electrode Assembly Manufacturing R&D	VI-7
VII.1	National Renewable Energy Laboratory: Technology Validation: Fuel Cell Bus Evaluations	VII-9
VII.2	National Renewable Energy Laboratory: Stationary Fuel Cell Evaluation.	VII-14
VII.4	National Renewable Energy Laboratory: Hydrogen Component Validation	VII-22
VII.4	Spectrum Automation Controls: Hydrogen Component Validation	VII-22
VII.6	National Renewable Energy Laboratory: Forklift and Backup Power Data Collection and Analysis	VII-31
VII.7	National Renewable Energy Laboratory: Fuel Cell Electric Vehicle Evaluation	VII-37
VII.8	National Renewable Energy Laboratory: Next Generation Hydrogen Infrastructure Evaluation	VII-41
VIII.1	National Renewable Energy Laboratory: Fuel Cell Technologies National Codes and Standards Development and Outreach	VIII-9
VIII.2	National Renewable Energy Laboratory: Component Standard Research and Development	VIII-13
VIII.9	National Renewable Energy Laboratory: NREL Hydrogen Sensor Testing Laboratory	VIII-49
VIII.9	Element One: NREL Hydrogen Sensor Testing Laboratory	VIII-49
X.3	National Renewable Energy Laboratory: Pathway Analysis: Projected Cost, Life-Cycle Energy Use and Emissions of Future Hydrogen Technologies	X-22
X.9	National Renewable Energy Laboratory: Electricity Market Valuation for Hydrogen Technologies.	X-46

Connecticut

II.B.2	Proton OnSite: Economical Production of Hydrogen through Development of Novel, High-Efficiency Electrocatalysts for Alkaline Membrane Electrolysis	II-21
II.B.3	Proton OnSite: Low-Noble-Metal-Content Catalysts/Electrodes for Hydrogen Production by Water Electrolysis	II-24
II.F.1	FuelCell Energy, Inc.: Bio-Fueled Solid Oxide Fuel Cells	II-81
III.6	FuelCell Energy, Inc.: Electrochemical Hydrogen Compressor	III-36
III.6	Sustainable Innovations, LLC: Electrochemical Hydrogen Compressor	III-36
IV.B.1	United Technologies Research Center: Hydrogen Storage Engineering Center of Excellence	IV-22
IV.B.3	United Technologies Research Center: Advancement of Systems Designs and Key Engineering Technologies for Materials-Based Hydrogen Storage	IV-36
V.D.2	United Technologies Research Center: Rationally Designed Catalyst Layers for PEMFC Performance Optimization.	V-100
V.F.2	University of Connecticut: The Effect of Airborne Contaminants on Fuel Cell Performance and Durability	V-133
V.F.2	WPCSOL, LLC: The Effect of Airborne Contaminants on Fuel Cell Performance and Durability	V-133
V.G.1	United Technologies Research Center: Fuel Cell Fundamentals at Low and Subzero Temperatures	V-140
VI.2	UTC Power: Manufacturing of Low-Cost, Durable Membrane Electrode Assemblies Engineered for Rapid Conditioning	VI-11
VII.5	Proton OnSite: Validation of an Advanced High-Pressure PEM Electrolyzer and Composite Hydrogen Storage, with Data Reporting, for SunHydro Stations	VII-26
VII.5	SunHydro LLC: Validation of an Advanced High-Pressure PEM Electrolyzer and Composite Hydrogen Storage, with Data Reporting, for SunHydro Stations	VII-26

Connecticut (Continued)

- VIII.8 Proton OnSite: Hydrogen Safety Panel and Hydrogen Safety Knowledge Tools VIII-43
- VIII.8 GWS Solutions of Tolland, LLC: Hydrogen Safety Panel and Hydrogen Safety Knowledge Tools. VIII-43

Delaware

- IV.D.2 Delaware State University: Hydrogen Storage Materials for Fuel Cell-Powered Vehicles. IV-95
- IV.D.2 University of Delaware: Hydrogen Storage Materials for Fuel Cell-Powered Vehicles IV-95
- V.A.2 University of Delaware: Extended, Continuous Pt Nanostructures in Thick, Dispersed Electrodes. V-15
- V.A.5 University of Delaware: The Science and Engineering of Durable Ultra-Low PGM Catalysts. V-30
- V.E.1 Ion Power Inc.: Durability Improvements through Degradation Mechanism Studies V-105
- V.E.2 Ion Power Inc.: Accelerated Testing Validation. V-111
- V.J.1 University of Delaware: Advanced Materials and Concepts for Portable Power Fuel Cells V-201
- VI.2 University of Delaware: Manufacturing of Low-Cost, Durable Membrane Electrode Assemblies Engineered for Rapid Conditioning. VI-11

Florida

- VIII.8 Addison Bain: Hydrogen Safety Panel and Hydrogen Safety Knowledge Tools VIII-43

Georgia

- II.G.6 University of Georgia: Hyperthermophilic Multiprotein Complexes and Pathways for Energy Conservation and Catalysis II-100

Hawaii

- V.F.2 Hawaii Natural Energy Institute: The Effect of Airborne Contaminants on Fuel Cell Performance and Durability V-133
- IX.3 Hawaii Natural Energy Institute: Hydrogen Energy Systems as a Grid Management Tool. IX-15

Illinois

- II.B.2 Illinois Institute of Technology: Economical Production of Hydrogen through Development of Novel, High-Efficiency Electrocatalysts for Alkaline Membrane Electrolysis II-21
- II.G.4 Argonne National Laboratory: Fundamental Design and Mechanisms for Solar Hydrogen Production in Natural and Artificial Photosynthetic Systems II-94
- II.G.19 Northwestern University: Argonne-Northwestern Solar Energy Research (ANSER) Center II-141
- III.1 Argonne National Laboratory: Hydrogen Delivery Infrastructure Analysis III-11
- IV.A.1 Argonne National Laboratory: System Analysis of Physical and Materials-Based Hydrogen Storage Options IV-11
- IV.D.1 Northwestern University: Design of Novel Multi-Component Metal Hydride-Based Mixtures for Hydrogen Storage. IV-92
- V.A.1 Argonne National Laboratory: Durable Catalysts for Fuel Cell Protection during Transient Conditions. V-9
- V.A.3 Argonne National Laboratory: Nanosegregated Cathode Catalysts with Ultra-Low Platinum Loading. V-19
- V.A.7 Illinois Institute of Technology: Synthesis and Characterization of Mixed-Conducting Corrosion-Resistant Oxide Supports V-46
- V.A.12 Argonne National Laboratory: Non-PGM Cathode Catalysts using ZIF-Based Precursors with Nanonetwork Architecture. V-74
- V.D.1 Argonne National Laboratory: High-Performance, Durable, Low-Cost Membrane Electrode Assemblies for Transportation Applications V-95
- V.D.2 Argonne National Laboratory: Rationally Designed Catalyst Layers for PEMFC Performance Optimization. V-100
- V.E.1 Argonne National Laboratory: Durability Improvements through Degradation Mechanism Studies. V-105

XV. Project Listings by State

Illinois (Continued)

V.I.1	Argonne National Laboratory: Performance of Advanced Automotive Fuel Cell Systems with Heat Rejection Constraints	V-167
V.M.1	Argonne National Laboratory: Best Practices and Benchmark Activities for ORR Measurements by the Rotating Disk Electrode Technique	V-215
VII.11	Gas Technology Institute: Performance Evaluation of Delivered Hydrogen Fueling Stations	VII-52
IX.2	Gas Technology Institute: Landfill Gas-to-Hydrogen	IX-12
X.2	Argonne National Laboratory: Employment Impacts of Infrastructure Development for Hydrogen and Fuel Cell Technologies	X-19
X.2	RCF Economic and Financial Consulting, Inc.: Employment Impacts of Infrastructure Development for Hydrogen and Fuel Cell Technologies	X-19
X.4	Argonne National Laboratory: Life-Cycle Analysis of Water Use for Hydrogen Production Pathways	X-27
X.5	Argonne National Laboratory: Impact of Fuel Cell System Peak Efficiency on Fuel Consumption and Cost.	X-30
X.6	Argonne National Laboratory: Analysis of Incremental Fueling Pressure Cost	X-36

Indiana

V.D.2	Indiana University Purdue University: Rationally Designed Catalyst Layers for PEMFC Performance Optimization.	V-100
-------	---	-------

Maryland

IV.B.5	Mark Paster: System Design, Analysis, Modeling, and Media Engineering Properties for Hydrogen Energy Storage	IV-47
IV.C.2	National Institute of Standards and Technology: Hydrogen Storage in Metal-Organic Frameworks	IV-73
IV.D.3	National Institute of Standards and Technology: Neutron Characterization in Support of the DOE Hydrogen Storage Program	IV-100
V.D.1	Johns Hopkins University: High-Performance, Durable, Low-Cost Membrane Electrode Assemblies for Transportation Applications.	V-95
VI.4	National Institute of Standards and Technology: Neutron Imaging Study of the Water Transport in Operating Fuel Cells	V-184
VI.2	W. L. Gore & Associates, Inc.: Manufacturing of Low-Cost, Durable Membrane Electrode Assemblies Engineered for Rapid Conditioning.	VI-11

Massachusetts

II.B.4	Giner, Inc.: High-Performance, Long-Lifetime Catalysts for Proton Exchange Membrane Electrolysis	II-28
III.9	Concepts NREC: Development of a Centrifugal Hydrogen Pipeline Gas Compressor	III-49
IV.E.1	Boston College: Novel Carbon(C)-Boron(B)-Nitrogen(N)-Containing H ₂ Storage Materials	IV-105
IV.E.1	Protonex Technology Corporation: Novel Carbon(C)-Boron(B)-Nitrogen(N)-Containing H ₂ Storage Materials.	IV-105
V.A.8	Northeastern University: Development of Novel Non-PGM Electrocatalysts for Proton Exchange Membrane Fuel Cell Applications	V-50
V.A.9	Massachusetts Institute of Technology: High-Activity Dealloyed Catalysts	V-56
V.A.9	Northeastern University: High-Activity Dealloyed Catalysts.	V-56
V.B.1	Giner, Inc.: Dimensionally Stable High Performance Membrane.	V-79
V.G.2	Giner, Inc.: Transport in Proton Exchange Membrane Fuel Cells	V-146
V.G.2	Tech-Etch: Transport in Proton Exchange Membrane Fuel Cells	V-146
V.G.2	Ballard Material Products, Inc.: Transport in Proton Exchange Membrane Fuel Cells	V-146
VII.13	Acumentrics: Demonstration of SOFC Generator Fueled by Propane to Provide Electrical Power to Real World Applications	VII-59

Massachusetts (Continued)

VIII.8 Firexplo: Hydrogen Safety Panel and Hydrogen Safety Knowledge Tools VIII-43
 IX.2 Ameresco, Inc.: Landfill Gas-to-Hydrogen IX-12

Michigan

IV.B.1 General Motors Company: Hydrogen Storage Engineering Center of Excellence IV-22
 IV.B.1 Ford Motor Company: Hydrogen Storage Engineering Center of Excellence IV-22
 IV.B.1 University of Michigan: Hydrogen Storage Engineering Center of Excellence IV-22
 IV.B.6 General Motors Company: Thermal Management of Onboard Cryogenic Hydrogen Storage Systems IV-52
 IV.B.7 Ford Motor Company: Ford/BASF-SE/UM Activities in Support of the Hydrogen Storage Engineering Center of Excellence. IV-56
 IV.B.7 University of Michigan: Ford/BASF-SE/UM Activities in Support of the Hydrogen Storage Engineering Center of Excellence IV-56
 IV.C.2 General Motors Company: Hydrogen Storage in Metal-Organic Frameworks IV-73
 IV.D.1 Ford Motor Company: Design of Novel Multi-Component Metal Hydride-Based Mixtures for Hydrogen Storage IV-92
 IV.F.3 Ford Motor Company: Synergistically Enhanced Materials and Design Parameters for Reducing the Cost of Hydrogen Storage Tanks IV-131
 V.A.2 General Motors Company: Extended, Continuous Pt Nanostructures in Thick, Dispersed Electrodes V-15
 V.A.7 Nissan Technical Center: Synthesis and Characterization of Mixed-Conducting Corrosion-Resistant Oxide Supports. V-46
 V.A.8 Michigan State University: Development of Novel Non-PGM Electrocatalysts for Proton Exchange Membrane Fuel Cell Applications V-50
 V.A.8 Nissan Technical Center: Development of Novel Non-PGM Electrocatalysts for Proton Exchange Membrane Fuel Cell Applications V-50
 V.A.9 General Motors Company: High-Activity Dealloyed Catalysts V-56
 V.C.1 General Motors Company: New Fuel Cell Membranes with Improved Durability and Performance V-83
 V.C.2 Nissan Technical Center: Advanced Hybrid Membranes for Next Generation PEMFC Automotive Applications V-87
 V.D.1 Michigan Technological University: High-Performance, Durable, Low-Cost Membrane Electrode Assemblies for Transportation Applications V-95
 V.D.1 General Motors Company: High-Performance, Durable, Low-Cost Membrane Electrode Assemblies for Transportation Applications. V-95
 V.G.3 General Motors Company: Investigation of Micro- and Macro-Scale Transport Processes for Improved Fuel Cell Performance V-151
 V.H.2 Kettering University: Roots Air Management System with Integrated Expander V-162
 VIII.8 General Motors Company: Hydrogen Safety Panel and Hydrogen Safety Knowledge Tools VIII-43

Minnesota

II.B.4 3M Company: High-Performance, Long-Lifetime Catalysts for Proton Exchange Membrane Electrolysis II-28
 V.A.1 3M Company: Durable Catalysts for Fuel Cell Protection during Transient Conditions V-9
 V.A.3 3M Company: Nanosegregated Cathode Catalysts with Ultra-Low Platinum Loading. V-19
 V.C.1 3M Company: New Fuel Cell Membranes with Improved Durability and Performance V-83
 V.C.2 3M Company: Advanced Hybrid Membranes for Next Generation PEMFC Automotive Applications V-87
 V.D.1 3M Company: High-Performance, Durable, Low-Cost Membrane Electrode Assemblies for Transportation Applications. V-95
 V.G.1 3M Company: Fuel Cell Fundamentals at Low and Subzero Temperatures. V-140
 V.L.1 3M Company: Advanced Ionomers and MEAs for Alkaline Membrane Fuel Cells V-211

XV. Project Listings by State

Missouri

- IV.C.4 University of Missouri: Multiply Surface-Functionalized Nanoporous Carbon for Vehicular Hydrogen Storage IV-86
- VIII.8 Becht Engineering: Hydrogen Safety Panel and Hydrogen Safety Knowledge Tools VIII-43

Nebraska

- III.3 Hexagon Lincoln: Development of High-Pressure Hydrogen Storage Tank for Storage and Gaseous Truck Delivery III-21
- IV.B.1 Hexagon Lincoln: Hydrogen Storage Engineering Center of Excellence IV-22
- IV.B.9 Hexagon Lincoln: Development of Improved Composite Pressure Vessels for Hydrogen Storage IV-65
- IV.F.3 Hexagon Lincoln: Synergistically Enhanced Materials and Design Parameters for Reducing the Cost of Hydrogen Storage Tanks IV-131

Nevada

- II.D.1 University of Nevada, Las Vegas: Semiconductor Materials for Photoelectrolysis II-48

New Jersey

- IV.C.3 Rutgers University: Hydrogen Trapping through Designer Hydrogen Spillover Molecules with Reversible Temperature and Pressure-Induced Switching IV-79

New Mexico

- IV.B.1 Los Alamos National Laboratory: Hydrogen Storage Engineering Center of Excellence IV-22
- IV.B.4 Los Alamos National Laboratory: Chemical Hydride Rate Modeling, Validation, and System Demonstration IV-43
- V.A.5 Los Alamos National Laboratory: The Science and Engineering of Durable Ultra-Low PGM Catalysts. V-30
- V.A.5 University of New Mexico: The Science and Engineering of Durable Ultra-Low PGM Catalysts V-30
- V.A.8 University of New Mexico: Development of Novel Non-PGM Electrocatalysts for Proton Exchange Membrane Fuel Cell Applications V-50
- V.A.8 Pajarito Powder: Development of Novel Non-PGM Electrocatalysts for Proton Exchange Membrane Fuel Cell Applications V-50
- V.A.8 Los Alamos National Laboratory: Development of Novel Non-PGM Electrocatalysts for Proton Exchange Membrane Fuel Cell Applications V-50
- V.A.11 Los Alamos National Laboratory: Non-Precious Metal Fuel Cell Cathodes: Catalyst Development and Electrode Structure Design V-69
- V.A.11 IRD Fuel Cells, LLC: Non-Precious Metal Fuel Cell Cathodes: Catalyst Development and Electrode Structure Design V-69
- V.C.3 Los Alamos National Laboratory: Resonance-Stabilized Anion Exchange Polymer Electrolytes V-91
- V.D.1 Los Alamos National Laboratory: High-Performance, Durable, Low-Cost Membrane Electrode Assemblies for Transportation Applications V-95
- V.E.1 Los Alamos National Laboratory: Durability Improvements through Degradation Mechanism Studies V-105
- V.E.2 Los Alamos National Laboratory: Accelerated Testing Validation. V-111
- V.E.4 Los Alamos National Laboratory: Open-Source PEMFC-Performance and Durability Model Consideration of Membrane Properties on Cathode Degradation V-122
- V.G.1 Los Alamos National Laboratory: Fuel Cell Fundamentals at Low and Subzero Temperatures V-140
- V.J.1 Los Alamos National Laboratory: Advanced Materials and Concepts for Portable Power Fuel Cells V-201
- VIII.3 Los Alamos National Laboratory: Hydrogen Safety, Codes and Standards: Sensors. VIII-16
- VIII.5 Los Alamos National Laboratory: Hydrogen Fuel Quality. VIII-28

New York

II.B.3 Brookhaven National Laboratory: Low-Noble-Metal-Content Catalysts/Electrodes for Hydrogen Production by Water Electrolysis II-24

II.G.2 University of Rochester: Real-Time Atomistic Simulation of Light Harvesting and Charge Transport for Solar Hydrogen Production II-89

II.G.8 Brookhaven National Laboratory: Heterogeneous Water Oxidation Catalysis With Molecular Catalysts . . . II-106

II.G.9 Brookhaven National Laboratory: Proton-Coupled Electron Transfer in Artificial Photosynthesis II-108

III.2 Mohawk Innovative Technologies, Inc.: Oil-Free Centrifugal Hydrogen Compression Technology Demonstration III-16

IV.E.2 Brookhaven National Laboratory: Aluminum Hydride: the Organo-Metallic Approach IV-111

V.A.4 Brookhaven National Laboratory: Contiguous Platinum Monolayer Oxygen Reduction Electrocatalysts on High-Stability Low-Cost Supports V-25

V.A.11 General Motors Company: Non-Precious Metal Fuel Cell Cathodes: Catalyst Development and Electrode Structure Design V-69

V.A.11 University of Rochester: Non-Precious Metal Fuel Cell Cathodes: Catalyst Development and Electrode Structure Design V-69

V.F.1 General Motors Company: Effect of System Contaminants on PEMFC Performance and Durability V-128

V.G.3 Rochester Institute of Technology: Investigation of Micro- and Macro-Scale Transport Processes for Improved Fuel Cell Performance V-151

V.G.3 University of Rochester: Investigation of Micro- and Macro-Scale Transport Processes for Improved Fuel Cell Performance V-151

V.J.1 Brookhaven National Laboratory: Advanced Materials and Concepts for Portable Power Fuel Cells V-201

VII.3 H2Pump LLC: Hydrogen Recycling System Evaluation and Data Collection VII-18

VII.14 Plug Power Inc.: Accelerating Acceptance of Fuel Cell Backup Power Systems VII-63

IX.4 Plug Power Inc.: Ground Support Equipment Demonstration IX-20

Ohio

II.D.2 Midwest Optoelectronics, LLC: Critical Research for Cost-Effective Photoelectrochemical Production of Hydrogen II-53

II.D.2 Xunlight Corporation: Critical Research for Cost-Effective Photoelectrochemical Production of Hydrogen II-53

II.D.2 University of Toledo: Critical Research for Cost-Effective Photoelectrochemical Production of Hydrogen . . . II-53

V.I.6 Battelle: Stationary and Emerging Market Fuel Cell System Cost Analysis - Material Handling Equipment V-193

VIII.8 Powdermet Inc.: Hydrogen Safety Panel and Hydrogen Safety Knowledge Tools VIII-43

Oregon

IV.B.1 Oregon State University: Hydrogen Storage Engineering Center of Excellence IV-22

IV.B.8 Oregon State University: Microscale Enhancement of Heat and Mass Transfer for Hydrogen Energy Storage IV-61

VII.14 IdaTech, LLC: Accelerating Acceptance of Fuel Cell Backup Power Systems VII-63

IX.1 ClearEdge Power: Fuel Cell Combined Heat and Power Commercial Demonstration IX-7

Pennsylvania

II.C.2 Bucknell University: Solar Hydrogen Production with a Metal Oxide-Based Thermochemical Cycle II-39

II.E.3 Pennsylvania State University: Fermentation and Electrohydrogenic Approaches to Hydrogen Production . . . II-71

IV.C.3 Pennsylvania State University: Hydrogen Trapping through Designer Hydrogen Spillover Molecules with Reversible Temperature and Pressure-Induced Switching IV-79

XV. Project Listings by State

Pennsylvania (Continued)

V.A.3	University of Pittsburgh: Nanosegregated Cathode Catalysts with Ultra-Low Platinum Loading	V-19
V.A.11	Carnegie Mellon University: Non-Precious Metal Fuel Cell Cathodes: Catalyst Development and Electrode Structure Design	V-69
V.G.3	Pennsylvania State University: Investigation of Micro- and Macro-Scale Transport Processes for Improved Fuel Cell Performance	V-151
VII.5	Air Products and Chemicals, Inc. : Validation of an Advanced High-Pressure PEM Electrolyzer and Composite Hydrogen Storage, with Data Reporting, for SunHydro Stations	VII-26
VIII.8	Air Products and Chemicals, Inc.: Hydrogen Safety Panel and Hydrogen Safety Knowledge Tools	VIII-43

Rhode Island

V.A.3	Brown University: Nanosegregated Cathode Catalysts with Ultra-Low Platinum Loading	V-19
-------	--	------

South Carolina

II.C.3	Savannah River National Laboratory: Electrolyzer Development for the HyS Thermochemical Cycle	II-45
III.4	Savannah River National Laboratory: Fiber Reinforced Composite Pipeline	III-24
IV.B.1	Savannah River National Laboratory: Hydrogen Storage Engineering Center of Excellence	IV-22
IV.E.3	Savannah River National Laboratory: Electrochemical Reversible Formation of Alane	IV-114
IV.F.5	Savannah River National Laboratory: Load-Sharing Polymeric Liner for Hydrogen Storage Composite Tanks	IV-140
V.A.10	University of South Carolina: Development of Ultra-Low Platinum Alloy Cathode Catalysts for PEM Fuel Cells	V-62
V.F.1	University of South Carolina: Effect of System Contaminants on PEMFC Performance and Durability	V-128
V.G.2	University of South Carolina: Transport in Proton Exchange Membrane Fuel Cells	V-146
V.H.1	Tetramer Technologies, LLC: New High-Performance Water Vapor Membranes To Improve Fuel Cell Balance-of-Plant Efficiency and Lower Costs (SBIR Phase II)	V-158
IX.2	Advanced Technology International: Landfill Gas-to-Hydrogen	IX-12

Tennessee

III.7	Oak Ridge National Laboratory: Vessel Design and Fabrication Technology for Stationary High-Pressure Hydrogen Storage	III-39
IV.F.1	Oak Ridge National Laboratory: Melt Processable PAN Precursor for High-Strength, Low-Cost Carbon Fibers (Phase II)	IV-118
IV.F.2	Oak Ridge National Laboratory: Development of Low-Cost, High-Strength Commercial Textile Precursor (PAN-MA)	IV-124
IV.F.3	AOC, LLC: Synergistically Enhanced Materials and Design Parameters for Reducing the Cost of Hydrogen Storage Tanks	IV-131
V.A.1	Oak Ridge National Laboratory: Durable Catalysts for Fuel Cell Protection during Transient Conditions	V-9
V.A.2	Oak Ridge National Laboratory: Extended, Continuous Pt Nanostructures in Thick, Dispersed Electrodes	V-15
V.A.3	Oak Ridge National Laboratory: Nanosegregated Cathode Catalysts with Ultra-Low Platinum Loading	V-19
V.A.11	Oak Ridge National Laboratory: Non-Precious Metal Fuel Cell Cathodes: Catalyst Development and Electrode Structure Design	V-69
V.C.1	Vanderbilt University: New Fuel Cell Membranes with Improved Durability and Performance	V-83
V.E.1	Oak Ridge National Laboratory: Durability Improvements through Degradation Mechanism Studies	V-105
V.E.2	Oak Ridge National Laboratory: Accelerated Testing Validation	V-111
V.G.3	University of Tennessee: Investigation of Micro- and Macro-Scale Transport Processes for Improved Fuel Cell Performance	V-151
V.I.3	Oak Ridge National Laboratory: Characterization of Fuel Cell Materials	V-178

Tennessee (Continued)

VI.2	University of Tennessee: Manufacturing of Low-Cost, Durable Membrane Electrode Assemblies Engineered for Rapid Conditioning	VI-11
X.1	Oak Ridge National Laboratory: Analysis of Optimal Onboard Storage Pressure for Hydrogen Fuel Cell Vehicles	X-13
X.7	Oak Ridge National Laboratory: Hydrogen Station Economics and Business (HySEB)--Preliminary Results	X-40

Texas

III.9	Texas A&M University: Development of a Centrifugal Hydrogen Pipeline Gas Compressor	III-49
V.D.2	University of Texas at Austin: Rationally Designed Catalyst Layers for PEMFC Performance Optimization	V-100
VIII.8	Air Liquide: Hydrogen Safety Panel and Hydrogen Safety Knowledge Tools	VIII-43

Utah

III.7	MegaStir Technologies: Vessel Design and Fabrication Technology for Stationary High-Pressure Hydrogen Storage	III-39
-------	---	--------

Virginia

II.A.1	Strategic Analysis, Inc.: Hydrogen Pathways Analysis for Polymer Electrolyte Membrane (PEM) Electrolysis	II-11
IV.A.2	Strategic Analysis, Inc.: Hydrogen Storage Cost Analysis	IV-17
IV.B.5	Strategic Analysis, Inc.: System Design, Analysis, Modeling, and Media Engineering Properties for Hydrogen Energy Storage	IV-47
IV.F.1	Virginia Polytechnic Institute and State University: Melt Processable PAN Precursor for High-Strength, Low-Cost Carbon Fibers (Phase II)	IV-118
IV.F.5	Virginia Polytechnic Institute and State University: Load-Sharing Polymeric Liner for Hydrogen Storage Composite Tanks	IV-140
V.G.2	Virginia Polytechnic Institute and State University: Transport in Proton Exchange Membrane Fuel Cells	V-146
VI.2	Strategic Analysis, Inc.: Fuel Cell Transportation Cost Analysis	V-173
VI.7	Strategic Analysis, Inc.: A Total Cost of Ownership Model for PEM Fuel Cells in Combined Heat and Power and Backup Power Applications	V-196
V.J.1	Virginia Polytechnic Institute and State University: Advanced Materials and Concepts for Portable Power Fuel Cells	V-201
VIII.8	William C. Fort: Hydrogen Safety Panel and Hydrogen Safety Knowledge Tools	VIII-43

Washington

III.7	Global Engineering and Technology: Vessel Design and Fabrication Technology for Stationary High-Pressure Hydrogen Storage	III-39
III.10	Pacific Northwest National Laboratory: Investigation of H2 Diaphragm Compressors to Enable Low-Cost Long-Life Operation	III-54
IV.B.1	Pacific Northwest National Laboratory: Hydrogen Storage Engineering Center of Excellence	IV-22
IV.B.2	Pacific Northwest National Laboratory: Systems Engineering of Chemical Hydrogen Storage, Pressure Vessel, and Balance of Plant for Onboard Hydrogen Storage	IV-30
IV.E.1	Pacific Northwest National Laboratory: Novel Carbon(C)-Boron(B)-Nitrogen(N)-Containing H2 Storage Materials	IV-105
IV.F.3	Pacific Northwest National Laboratory: Synergistically Enhanced Materials and Design Parameters for Reducing the Cost of Hydrogen Storage Tanks	IV-131

XV. Project Listings by State

Washington (Continued)

V.K.1	InnovaTek, Inc.: Power Generation from an Integrated Biomass Reformer and Solid Oxide Fuel Cell (SBIR Phase III Xlerator Program)	V-208
VI.3	Boeing Research and Technology: Development of Advanced Manufacturing Technologies for Low-Cost Hydrogen Storage Vessels	VI-15
VI.3	Pacific Northwest National Laboratory: Development of Advanced Manufacturing Technologies for Low-Cost Hydrogen Storage Vessels	VI-15
VIII.7	Pacific Northwest National Laboratory: Hydrogen Emergency Response Training for First Responders	VIII-40
VIII.7	Hazardous Materials Management and Emergency Response Training and Education Center: Hydrogen Emergency Response Training for First Responders	VIII-40
VIII.8	Pacific Northwest National Laboratory: Hydrogen Safety Panel and Hydrogen Safety Knowledge Tools	VIII-43
IX.1	Pacific Northwest National Laboratory: Fuel Cell Combined Heat and Power Commercial Demonstration	IX-7
IX.6	Pacific Northwest National Laboratory: Fuel Cell-Based Auxiliary Power Unit for Refrigerated Trucks	IX-26

Washington, D.C.

V.A.9	George Washington University: High-Activity Dealloyed Catalysts	V-56
-------	---	------

Wisconsin

V.H.2	Eaton Corporation: Roots Air Management System with Integrated Expander	V-162
-------	---	-------

Foreign Countries

Canada

IV.B.1	Université du Québec à Trois-Rivières: Hydrogen Storage Engineering Center of Excellence	IV-22
V.A.1	Dalhousie University: Durable Catalysts for Fuel Cell Protection during Transient Conditions	V-9
V.A.1	Automotive Fuel Cell Cooperation: Durable Catalysts for Fuel Cell Protection during Transient Conditions	V-9
V.A.5	Ballard Fuel Cells: The Science and Engineering of Durable Ultra-Low PGM Catalysts	V-30
V.A.11	University of Waterloo: Non-Precious Metal Fuel Cell Cathodes: Catalyst Development and Electrode Structure Design	V-69
V.E.2	Ballard Power Systems: Accelerated Testing Validation	V-111
V.E.4	Ballard Power Systems: Open-Source PEMFC-Performance and Durability Model Consideration of Membrane Properties on Cathode Degradation	V-122
V.E.4	University of Calgary: Open-Source PEMFC-Performance and Durability Model Consideration of Membrane Properties on Cathode Degradation	V-122
V.F.2	Ballard Power Systems: The Effect of Airborne Contaminants on Fuel Cell Performance and Durability	V-133
V.G.1	McGill University: Fuel Cell Fundamentals at Low and Subzero Temperatures	V-140
V.H.2	Ballard Power Systems: Roots Air Management System with Integrated Expander	V-162
V.I.7	Ballard Power Systems: A Total Cost of Ownership Model for PEM Fuel Cells in Combined Heat and Power and Backup Power Applications	V-196
VII.10	Hydrogenics Corporation: California State University Los Angeles Hydrogen Refueling Facility Performance Evaluation and Optimization	VII-49
IX.5	Hydrogenics Corporation: Maritime Fuel Cell Generator Project	IX-23

Germany

IV.B.7 BASF SE: Ford/BASF-SE/UM Activities in Support of the Hydrogen Storage Engineering Center of Excellence. IV-56

IV.F.4 BMW: Thermomechanical Cycling of Thin-Liner High-Fiber-Fraction Cryogenic Pressure Vessels Rapidly Refueled a by LH2 pump to 700 bar IV-136

V.A.9 Technical University Berlin: High-Activity Dealloyed Catalysts V-56

V.J.1 SFC Energy: Advanced Materials and Concepts for Portable Power Fuel Cells V-201

Israel

V.L.1 CellEra, Inc.: Advanced Ionomers and MEAs for Alkaline Membrane Fuel Cells V-211

Japan

III.2 Mitsubishi Heavy Industries, Ltd: Oil-Free Centrifugal Hydrogen Compression Technology Demonstration III-16

III.7 Kobe Steel, LTD: Vessel Design and Fabrication Technology for Stationary High-Pressure Hydrogen Storage. III-39

United Kingdom

V.A.9 Johnson Matthey Fuel Cells: High-Activity Dealloyed Catalysts V-56

V.D.2 Johnson Matthey Fuel Cells: Rationally Designed Catalyst Layers for PEMFC Performance Optimization. V-100

V.J.1 Johnson Matthey Fuel Cells: Advanced Materials and Concepts for Portable Power Fuel Cells V-201