DOE Resources for the U. S. Chemical Industry

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Industrial Technologies Program
Energy Efficiency and Renewable Energy
U.S. Department of Energy

Offices supporting R&D for energy efficient processes; alternative energy production, storage and transmission; and alternative fossil based feedstocks and chemistries are:

- Energy Efficiency and Renewable Energy (EERE)
  - Biomass; Hydrogen, Fuel Cells & Infrastructure Technologies; Industrial Technologies; Solar Energy Technologies; Wind & Hydropower Technologies; Geothermal Technologies
- Fossil Energy (FE)
  - Clean Coal, FutureGen, Vision21, Gasification Technologies, Advanced Combustion Systems, Advanced Combustion Systems, Future Fuel Cells, Turbines of Tomorrow, Advanced Research
- Science (OS)
  - Basic Energy Sciences
  - Small Business Innovation Research
  - Small Business Technology Transfer Programs

EERE: Biomass Program

- No annual solicitations
- Next solicitation projected for 2008 due to budget cuts and earmarks
- Collaboration: Cost-shared projects with industry, universities, national labs, private research institutes
  - Objective: Conversion, separations, and purification processes for fuels, chemicals/materials, heat and power for enabling emerging and future biorefineries. Bio-derived sugars, syngas or oil leading to production of chemical products and supporting the biorefinery concept
  - Evaluation Criteria: Concept feasibility, potential for achieving technical objectives/performance targets, commercialization potential
  - www.eere.energy.gov/biomass/
  - Contact(s): Valerie Sarisky Reed, 6-8014; Paul Grabowski, 6-0478; Doug Elliott, 6-1475

EERE: Hydrogen Program

Hydrogen Production & Delivery, Storage, & Fuel Cells

- Annual solicitation, $75 million in FY 2005 (President's Initiative)
- Typical project award is $1-3 million over 2-4 years
- Collaboration: Cost-shared projects with industry, universities, and private institutions. Cost-share ≥ 20%
- R&D Priorities: Fossil based, bio-based, electrolytic, photolytic, high temperature production; compression and liquefaction and pipeline delivery; new materials for tanks for compressed gas, vessels for cryogenic liquid H2, hydrides for solid state H2 storage, and nanostructures for storage and release of H2; fuels cells for transportation, stationary and portable power systems.
- Evaluation Criteria: Concept feasibility, potential for achieving technical objectives/performance targets.
- www.eere.energy.gov/hydrogenandfuelcells/
- Contact(s): JoAnn Milliken, 6-2480; Pete Devlin, 6-4905; Sunita Satyapal, 6-2336; Valrie Lightner, 6-0937.

EERE: Industrial Technologies Program

- Chemicals and Enabling Technologies
  - Industrial Energy Systems – (Jim Quinn, 6-5725)
    - Combustion (Bob Gemmer, 6-5885)
  - Chemicals (Dickson Ozokwelu, 6-1805)
    - Separations – to reduce energy load on distillation systems; membrane and catalytic membrane process technologies, integrated or hybrid systems.
    - Reactions – improved catalytic oxidations, direct oxidation of paraffin hydrocarbons to commodity chemicals, new homogeneous catalytic processes, new processes for inorganic commodity chemicals
- Advanced Process Systems
  - Materials (Sara Dillich, 6-7925)
  - Sensors and Automation (Gideon Varga, 6-0082)

EERE: Industrial Technologies Program

- Solicitations to be issued 1st and 2nd Quarters FY05.
- Seeking high value/high technical risk projects
- Evaluation Criteria: energy benefits, technical merit, project management plan, commercialization plan, and team capabilities, economic benefits, environmental benefits.
- Awards are based on a competitive process open to collaborative teams, including producers, suppliers, universities, national labs, and others.
- Typically 30-50% costshare required.

EERE: Solar, Wind & Hydropower, and Geothermal Technology Programs

- Various RD&D programs, financial incentives, and partnerships to encourage use of renewable power technologies (solar, wind, geothermal, others)
- 2005 Solar – 4.5M - solar powered thermochemical production of H2
- 2005 Solar – Million Solar Roofs & PV, commercial and residential bldgs.
- 2005 – Wind Program Solicitation
  - Conceptual designs, components and full prototypes for turbines operating at class 4 (low wind speed – 5-8m/s at 10m)
  - Optimization of existing hydropower plants
- 2006 Geothermal General Solicitation – Energy Systems, Exploration R&D, Geosciences
- www.eere.energy.gov/
- Contact(s): Ray Sutula, 6-8064; Glenn Strahs, 6-2305; Jim Ahlgrimm, 6-9806; Roy Mink, 6-5463

Office of Fossil Energy (FE)

- Coal Gasification and Carbon Sequestration
  - Solicitations: Clean Coal Power Initiative (every 2 years), University Coal Research (UCR) Program (annual)
  - Awards: Fall 2004 CCP Initiative: $280 million, all topics, 50% cost-share; UCR Program: $50k-400k,1-3 year projects (more collaborators →more $). Sequestration: ~$140 million/year for ~60 projects (36% cost share)
  - Topics: Advanced gasification technologies, materials and sensors for gasification systems, carbon management, carbon separation technologies
  - Project evaluation criteria: Demonstration of progress toward Coal Program targets, commercialization & market penetration potential
  - Coal Gasification: www.fossil.energy.gov/programs/powersystems/gasification/gasificationresearch.html
  - Clean Coal Initiative: www.fossil.energy.gov/programs/powersystems/cleancoal/index.html
  - Carbon Sequestration: www.fossil.energy.gov/programs/sequestration/index.html

Office of Fossil Energy (FE)

- Oil and Gas Program Solicitation 2005
  - Topic Areas: VSP Subsurface Imaging, Reservoir Characterization and Management, Heavy Oil Recovery, Gas Flooding, PUMP Field Demonstrations, Inspection Technologies, Remote Sensing, Operational Technologies, Materials Development, and Alternative Storage Technologies
- Solid State Energy Conversion Alliance (SECA) Core Technology Program
  - Topic Areas: Materials and Fuel Processing
- Support of Advanced Fossil Resource Conversion and Utilization Research by Historically Black Colleges and Universities and Other Minority Institutions
  - Topic Areas: Advanced Environmental Control Technologies for Coal, Advanced Coal Utilization, Clean Fuels Technology, Oil Shale and Oil (TAR) Sands Processing & Environmental Factors, Geology of Selected Oil (Tar) Sands Deposits, Improved Materials for Horizontal Coil Tubing Drill Rigs, Natural Gas Exploration, Production, and Storage, Fuel Cells, Faculty/Student Exploratory Research Training Grants

Office of Fossil Energy (FE)

- Support of Advanced Coal Research at U.S. Colleges and Universities
  - Topic Areas: Computer-Aided Design of High-Temperature Materials, Nano-Technology for Coatings in Coal-Fired Environments, Multi-Pollutant Controls by OxyCombustion, Novel Sensors for Slagging Coal Gassification Systems, Electrically-Conductive, Low-Temperature Sintering Materials for Cathode/Interconnect Contact in Solid Oxide Fuel Cells, Partitioning and Mechanism Studies for Mercury and Associated Trace Metals within Coal-Fired Processes, Water Impacts from Coal-Burning Power Plants, Joining and Sealing High Temperature Gas Separation Membranes, Computational Chemistry in Support of Hydrogen from Coal, Hydrogen Production and Separation, Measurement and Analysis to Quantify the Contribution of Coal-Fired Utility Boiler Emissions to Ambient PM2.5, Separating Ambient PM2.5 into Source-Specific Fractions for Use in Toxicology Studies, Turbine Combustion: Chemical Kinetics

OS: Basic Energy Sciences

- Total R&D Budget is 500M.
  - Annual solicitation – 475M
  - Hydrogen Fuel Initiative – 25M
  - Grants to all entities – labs, universities, businesses, research institutions
  - Unsolicited proposals encouraged
- Sub-programs of interest:
  - Chemical Sciences - Catalysis and Chemical Transformations; Separations; Analytical Chem; Chemical Engineering; Photovoltaics; Electrochemistry (Walt Stevens, 3-2046)
  - Materials Sciences and Engineering (Harriet Kung, 3-1330)
  - Energy Biosciences (Jim Tavares, 3-6190)
- http://www.sc.doe.gov/grants/

OS: Basic Energy Sciences

- FY 2005 Research Budget – 500M
- Nanoscale Science $70 million – construction of 6 NRCs associated at National Labs.
- Hydrogen $35 million includes 25M increase
- Chemical Sciences
  - Chemical Physics $31 million
  - Catalysis & Chemical Transformation $30 million
  - Separations $16.4 million
  - Chemical Energy/Engineering $10.7 million

OS: Basic Energy Sciences

- Chemical Sciences – 225M
  - Grants (open April 1-Sept 30)
  - Typical project: $115-150/yr per PI; often multiple PIs involved bringing project costs to 1.5M over 3-4 years
  - Collaboration: Open to colleges, universities, non-profits, for-profits, national labs
  - Topics: Fundamental research in catalysis, separations, chemical physics, chemical energy
  - Evaluation Criteria: Scientific and/or technical merit or educational benefits; appropriateness of proposed approach; competency of personnel and adequacy of proposed resources; reasonableness of proposed budget.
  - www.sc.doe.gov/grants/Fr04-01.html
  - www.er.doe.gov/production/grants/605.html

OS: Basic Energy Sciences

- Biosciences – 50M
  - Grants (pre-application February, submission by June)
  - Typical project $1 - 1.5M over 3-4 years
  - Collaboration: Open to colleges, universities, non-profits, for-profits, national labs
  - Topics: Fundamental science research in biocatalysis, carbon fixation/storage, conversion of hydrocarbons, carbohydrates
  - Selection Criteria: Scientific and/or technical merit or educational benefits; appropriateness of proposed approach; competency of personnel and adequacy of proposed resources; reasonableness of proposed budget.
  - www.sc.doe.gov/grants/Fr04-01.html
  - www.er.doe.gov/production/grants/605.html

OS: Small Business Innovation Research (SBIR) And Small Business Technology Transfer Programs (STTR)

- Competitive annual solicitation, $100 million in FY 2005 (closes Dec. 13, 2004)
- 2.8% of total DOE R&D Budget set-aside for SBIR and STTR
- Phase I, 6 – 8 month, $100K for proof of concept/applied research
- Phase II, 24 months, 750K for development, pilot scale and demonstration
- Contact(s): Julie Scott or Carl Hebron, 301-903-1414
- www.science.doe.gov/sbir/

OS: 2005 SBIR/STTR Solicitation Topics

- FOSSIL ENERGY (Jerry Shang)
  - 9. Capture, Sequestration, and Utilization of Carbon (David Lang, 412-386-4881)
  - 10. Coal Gasification Technologies (Jenny Tennant, 304-285-4830)
  - 11. Environmental Technology for Existing Fossil Energy Facilities (Bill Aljoe, 412-386-6569)
  - 12. Oil, Tar Sands, and Oil Shale Technologies (Dan Gurney, 918-699-2063)
  - 13. Natural Gas and Hydrogen Separation Technologies (Tony Zammerilli, 304-285-4641)
  - 14. Solid Oxide Fuel Cell (SOFC) and Material Research (Travis Shultz, 304-285-1370)
  - 15. Materials Research (Richard Dunst, 412-386-6694)

OS: 2005 SBIR/STTR Solicitation Topics

- BASIC ENERGY SCIENCES (Bob Atheimer)
  - 16. Advanced Fossil Fuels Research (Doug Archer, 301-903-9443)
  - 17. Technologies Related to Energy Storage for Electric and Hybrid Vehicles (Jim Barnes, 6-5656)
  - 18. Technologies for Hydrogen Transport and Storage (Sunita Satyapal, 6-2336)
  - 19. Energy Efficient Membranes (Charles Russomanno, 6-7543)
  - 20. Nanotechnology Applications in Industrial Chemistry (Brian Valentine, 6-1739)
  - 21. Alternative Reaction Media for Industrial Chemical Processes (Russomanno, 6-7543)
  - 22. Solid State Inorganic and Organic Light Emitting Diodes for General Lighting (Brodrick, 6-1856)

OS: 2005 SBIR/STTR Solicitation Topics

- ENERGY EFFICIENCY AND RENEWABLE ENERGY (Charles Russomanno)
  - 26. Innovative Waste Heat Recovery Technology and Novel Cooling Systems (Gemmer, 6-5885)
  - 27. Advanced Materials (Richard Orrison, 6-1633)
  - 28. New Energy Sources (Alec Bulawka, 6-5633)
  - 29. Advanced Power Electronics Technologies (Jim Ahlgrimm, 6-9806)
  - 30. Reactions and Separations (Russomanno, 6-7543)
  - 31. Sensors and Controls for Efficiency and Renewable Energy Applications (Ray Lasala – 6-4198)

Important websites:

- Industry Interactive Procurement System - http://e-center.doe.gov/
- National Energy Technology Laboratory - http://www.netl.doe.gov/business/solicit/
- Basic Energy Sciences http://www.sc.doe.gov/grants/grants/
- DOE Office of Science Small Business and Innovation Research - http://www.er.doe.gov/sbir/
- www.energy.gov

Solicitations

Elements of Success

- Consistent with program mission, funding and relevant topic areas
- Technically sound and justified with data
- Backed with clearly quantified energy and other impacts
- Clear work and management plan with milestones and decision points