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Energy Dept. Awards $22.7 Million for Basic Solar Energy Research

WASHINGTON, DC – The U.S. Department of Energy (DOE) today announced $22.7 million in basic research projects aimed at improving the capture, conversion, and use of solar energy. The research will help increase the amount of solar power in the nation's energy supply.

"These projects are part of our aggressive basic research in the physical sciences—what I call 'transformational science'—aimed at achieving a new generation of breakthrough technologies that will push the cost-effectiveness of renewable energy sources to levels comparable to petroleum and natural gas sources," Under Secretary for Science Dr. Raymond L. Orbach said.

DOE's Office of Science selected 27 projects that will focus on fundamental science to support enhanced use of solar energy. Universities and national laboratories in 18 states will conduct the research.

The projects are part of a department-wide, comprehensive, balanced portfolio of basic and applied research and technology development aimed at significantly advancing the use of sunlight as a practicable solution to meet our compelling need for clean, abundant sources of energy. These projects, along with the commercialization projects funded through the Solar America Initiative, form an important component of President Bush's Advanced Energy Initiative. DOE plans to fund additional projects in fiscal year 2008.

The projects will address two priority technical areas:

Conversion of Solar Energy to Electricity (14 projects, $9.9 million over three years)
The challenge in converting sunlight to electricity is to greatly reduce the cost per watt of delivered solar electricity by dramatically improving the conversion efficiency. A broad range of research on novel approaches to solar-to-electricity conversion is covered by these projects, including: nanostructured inorganic photovoltaics, plasmonic conversion concepts, organic and hybrid inorganic-organic photovoltaics, multiple-exciton generation for enhanced conversion, and nano-arrays for improved photoelectrochemical cell performance.

Conversion of Solar Energy to Chemical Fuels (13 projects, $12.8 million over three years) The direct conversion of sunlight into chemical fuels is vital in order to overcome the problem of the day/night variation of the solar resource and to provide solar-derived energy in forms useful for transportation, residential, and industrial applications. Projects in this area focus on two major areas: detailed studies of the machinery of natural photosynthetic systems aimed at biomimetic approaches to solar water splitting and photocatalytic schemes for the direct conversion of sunlight into hydrogen or hydrocarbon fuels.

The list of new projects follows.

Basic Research for Solar Energy Utilization	
Institution	**Project Title**
Solar Energy to Electricity	
Arizona State University	Dynamical Arrest, Structural Disorder, and Optimization of Organic Photovoltaic Devices
California Institute of Technology	Plasmonic Photovoltaics
University of Colorado	Study of Multiple Exciton Generation with New Multi-Dimensional Spectroscopies
Cornell University	Cross-Cutting Tools for Theoretical Organic Photovoltaic Research
Massachusetts Institute of Technology	Probing Nanocrystal Electronic Structure and Dynamics in the Limit of Single Nanocrystals
Massachusetts Institute of Technology	High Efficiency Biomimetic Organic Solar Cells
University of Minnesota	Monodispersed Zinc Oxide Nanoparticle-Dye Dyads and Triads: Characterization of the Early Events in Dye-Sensitized Solar Cells
University of Minnesota	Extracting Hot or Multiple Charge Carriers from Photoexcited Semiconductor Nanocrystals
Ohio State University	Designing Nanoparticle/Nanowire Composites and "Nanotree" Arrays as Electrodes for Efficient Dye-Sensitized Solar Cells
University of Oregon	Conjugated Ionomers for Photovoltaic Applications: Electric Field Driven Charge Separation at Organic Junctions
University of Pittsburgh	Nanocrystal-Based Dyads for Solar to Electric Energy Conversion
University of South Carolina	Hybrid Organic-Inorganic Composite Solar Cells for Efficient, Low-Cost, Photoelectric Energy Conversion
Stanford University	Nanophotonics-Enhanced Solar Cells
University of Washington	Molecular and Nanoscale Engineering of High Efficiency Polymer and Hybrid Organic/Inorganic Solar Cells

Solar Energy to Fuels	
Brookhaven National Laboratory	Solar Fuel Production Catalyzed by Transition-Metal Complexes
University of Chicago	New Transition Metal Building Blocks and Assemblies for Photocatalytic Fuel Production
Emory University	Solar Energy-Driven Robust Multi-Electron-Transfer Catalysts for Water Oxidation
University of Illinois	Self Assembly & Self-Repair of Novel Photosynthetic Reaction Center/Single Walled Carbon Nanotube Complexes for Solar Energy Conversion-Synthetic Analogs to Natural Processes
Lawrence Berkeley National Laboratory	Nanomaterials and Bio-inspired Approaches to Solar Derived Fuels
University of Michigan	Two-Dimensional Electronic Spectroscopy of Light-Harvesting Complexes
Montana State University	Protein Architectures for Photo-Catalytic Hydrogen Production
North Carolina State University	Molecular-Level Organization of Heterometallic Oxides/Organics for Photocatalysis
University of Pennsylvania	Semiconductor Ferroelectrics and Surface Nanomaterials for Highly Efficient Solar Hydrogen Production
Pennsylvania State University	Nanostructured Photocatalytic Water Splitting Systems
Rensselaer Polytechnic Institute	Elucidating the Principles that Control Proton-Coupled Electron Transfer Reactions in the Photosynthetic Protein, Photosystem II. A Model for Design of Bio-inspired Photocatalytic Water Splitting
Washington University	Mechanism of Solar Energy Storage by Chlorosome Antennas of Green Photosynthetic Bacteria
Yale University	Oxomanganese Catalysts for Solar Fuel Production

The basic solar research program is administered by the department's Office of Basic Energy Sciences in the Office of Science. For more information, visit: http://www.sc.doe.gov/bes/bes.html. For more information about DOE's Solar America Initiative, visit: http://www1.eere.energy.gov/solar/solar_america/ .

DOE's Office of Science is the single largest supporter of basic research in the physical sciences in the nation and helps ensure U.S. world leadership across a broad range of scientific disciplines. The Office of Science supports a diverse portfolio of research at more than 300 colleges and universities nationwide, manages 10 world-class national laboratories with unmatched capabilities for solving complex interdisciplinary scientific problems, and builds and operates the world's finest suite of scientific facilities and instruments used annually by more than 19,000 researchers to extend the frontiers of all areas of science.

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