

Partnerships for International Research and Education (PIRE)

(C. Scott comment: link this to an NSF Research Collaborative Network RCN proposal? For some preliminary thinking on proposal concepts, see bottom of p. 2 and following pages)

The PIRE Program Dear Colleague Letter announces that the upcoming FY2011-2012 PIRE competition will focus exclusively on the NSF-wide Science, Engineering, and Education for Sustainability (SEES) investment area. Through SEES, NSF seeks to enable discoveries needed for environmental, energy and societal sustainability while creating the necessary workforce to address these challenges. By focusing PIRE on SEES, NSF invests strategically in activities where intellectual foci are global, comparative understanding of international variability is required, and best tackled with intellects from around the world engaged in leading-edge discovery and innovation.

More information about NSF's SEES investment area can be found on the SEES webpage.

- > *NSF established the Science, Engineering, and Education for Sustainability (SEES) investment area in FY 2010 in order to address challenges in climate and energy research and education using a systems-based approach to understanding, predicting, and reacting to change in the linked natural, social, and built environment. Initial efforts were focused on coordination of a suite of research and education programs at the intersection of climate and environment, including specific attention to incorporating human dimensions.*
- > *SEES is expected to be a 5-year effort, extending through FY15. Continuing efforts will focus on supporting research that facilitates global community sustainability, specifically through building connections between current projects, creating new nodes of activity, and developing personnel needed to solve sustainability issues. Future efforts will be expanded to include sustainable energy research in science and engineering, and its socioeconomic and environmental implications.*
- > *The NSF-wide SEES Portfolio is expected to include:*
 - * *short and long term observations enabled by a new generation of experimental and observational networks;*
 - * *data analysis, modeling, simulation and intelligent decision-making facilitated by advanced computation;*
 - * *research at the energy-environment-society nexus;*
 - * *innovative strategies for energy production, distribution and use;*
 - * *study of societal factors such as vulnerability and resilience, and sensitivity to regional change;*
 - * *building of research and education partnerships, both nationally and internationally; and*
 - * *developing the workforce required for future economic, energy and environmental sustainability.*

Of particular interest is the recent US NSF - Dear Colleague Letter for the Science, Engineering and Education for Sustainability (SEES) NSF-Wide Investment Area (nsf11022).

Anticipated revisions to the PIRE solicitation include: exclusive focus on SEES; elimination of the preliminary proposal requirement; and a limit of one full proposal from each eligible institution.

The new PIRE solicitation will be posted on the NSF website, including the OISE homepage, upon release, expected in April, 2011. Proposals will be due in late summer or early fall and awards made in spring of 2012. The solicitation for the subsequent PIRE competition, which will also focus on SEES, is expected to be released in FY2014, with awards in FY2015. For questions about the PIRE program in general, contact one of the listed OISE personnel.

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SYNOPSIS

The Partnerships for International Research and Education (PIRE) program seeks to catalyze a higher level of international engagement in the U.S. science and engineering community by supporting innovative, international research and education collaborations. The program will enable U.S. scientists and engineers to establish collaborative relationships with international colleagues in order to advance new knowledge and discoveries at the frontiers of science and engineering and to promote the development of a diverse, globally-engaged U.S. scientific and engineering workforce. International partnerships are, and will be, increasingly indispensable in addressing many critical science and engineering problems. As science and engineering discoveries result more and more from international collaboration, U.S. researchers and educators must be able to operate effectively in teams comprised of partners from different nations and cultural backgrounds. The PIRE program will support bold, forward-looking research whose successful outcome results from all partners—U.S. and foreign—providing unique contributions to the research endeavor. It is also intended to facilitate greater student preparation for and participation in international research collaboration, and to contribute to the development of a diverse, globally-engaged U.S. science and engineering workforce. The program aims to support partnerships that will strengthen the capacity of institutions, multi-institutional consortia, and networks to engage in and benefit from international research and education collaborations.

THE WATER-ENERGY NEXUS ADAPTIVE RESPONSE TO CLIMATE CHANGE IN THE ARID AMERICAS

Potential themes (research and capacity building/ curriculum) areas:

1. Groundwater – electrical energy in agriculture and urban areas – resources, economics, social vulnerability
2. Biofuels – water – land/ecosystem service nexus
3. Hydropower response to changing climate/hydrology, water rights, sectoral policies
4. Policies and institutions for coupling energy and water
5. Transboundary dimensions (implications) of water and energy movement, trading, etc.

Expressions of interest in “water, energy, climate, adaptation” from potential U.S. collaborators:

- A. Arizona State University, School of Geographical Sciences and Planning - Martin Pasqualetti
- a. Water/energy nexus in arid Americas (NSF Collaborative Research Network) -My research interest in the water/energy nexus in the arid Americas includes the impacts on energy policy, facility siting, and virtual water transfers. Two questions prevail. The first research question is: What impact will the water/energy nexus have on the development of renewable energy? The arid Americas have substantial potential for the development of solar energy, but given the water requirements of CSP, there are only two plausible options: photovoltaics (PVs) and dry-cooled CSP. Either approach, and particularly PVs hold promise of electrical generation in these areas, whereas conventional energy resources would be problematic. The value of the arid areas should rise as a result of increased solar energy development. This could occur in either of two scenarios: (1) the arid areas are used as the sites for ‘energy farms’; that is, the generation of electricity to be used elsewhere, or (2) the arid areas are used to generate electricity used locally in the event that it might be feasible to use solar energy to improve the quality of groundwater resources that might be available.
 - b. The second research question is: What is the impact of the water/energy nexus on the siting of power plants, the design of the power plants, and the price of electricity? Combined-cycle natural gas plants would be favored over any of the conventional energy resources in those areas where natural gas is available. Purely from the standpoint of water consumption, dry cooling would be favored over wet cooling, but it would drive up the price of electricity. The balance between water availability, need for electricity, and price for that electricity will be a constant concern.
- B. The University of Texas at Austin. Center for International Energy and Environmental Policy, Department of Energy and Earth Resources, Jackson School of Geosciences. Suzanne A Pierce <suzpierce@mail.utexas.edu>
- a. The idea of a water-energy-climate-adaptation RCN proposal sounds great and it is very timely. You can count the Center for International Energy and Environmental Policy (CIEEP) in as an interested partner. I’ve talked with Chip Groat, our Director, and he’s very supportive. Carey King is a Researcher in our group and he’s forwarded information about his work. He’s also mentioned that Economics and Ag modeling (perhaps Illinois?) would be an important inclusion. And, he’s got Brazilian collaborations that may be helpful if you want to include Brazilian counterparts. On my end, I’ve just learned that I will be a Fulbright Nexus scholar this coming year (May 11-April 12) in Latin America, with a home base at two Chilean Institutions (UChile and Catolica del Norte). The proposal is to build a cyberinfrastructure system and I would welcome any and all collaboration in making it something meaningful (see portion of the application attached). We’ve got an MOU with the two institutions I mentioned above, particularly with their Center for Natural Resource and Environmental Economics at UChile and the Geothermal Center for Excellence/Geosciences Department at Catolica del Norte in Antofagasta.

- C. Stockholm Environment Institute, U. S. Center, David Purkey dpurkey@sei-us.org and Francisco Flores-Lopez, Ph. D., Scientist, Water Resources Program, 133 D Street | Suite F | Davis, CA 95616 | USA. P: +1.530.753.3035 X5 | F: +1.530.753.3477 www.sei-us.org | Skype: fco-flores
- a. Water and energy policy are increasingly connected and face interrelated challenges: 1) the provision of adequate water supplies to match growing energy demands, 2) the fast growing energy needs of our water supply systems, and 3) how best to manage the competing demands on our water systems. These challenges are emerging at a time when there are increasing concerns over how climate change will affect the future reliability of freshwater supplies and how current energy policy influences climate change in different parts of the world. The Stockholm Environment Institute (SEI)'s water and energy planning models, Water Evaluation and Planning system (WEAP) and Long-range Energy Alternatives Planning system (LEAP), are intended to provide new insights into the cross-cutting challenges of integrated water and energy planning. One of SEI's research goals is to link water management options, such as reuse, reservoir re-operation, demand-side management, land use changes, etc., as represented in the WEAP portion of the tool, to models of the electric utility serving the water utilities, as represented in LEAP. Currently SEI's researchers have been working on a couple of projects related to the water and energy sector: 1) Exploring the Water- Energy Nexus in the American River Watershed, California, and 2) Statewide Integrated Water and Energy Planning in California. SEI is looking forward to new future collaborations where the WEAP-LEAP models could be applied as decision support tools.
- D. Sandia Labs
- a. Project Title: Energy and Water in the Western and Texas Interconnects (DOE supported). Dr. Vincent Tidwell (email: vctidwe@sandia.gov), PI
- b. Project Objective(s): Develop an integrated Energy-Water Decision Support System (DSS) that will enable planners in the Western and Texas Interconnections to analyze the potential implications of water stress for transmission and resource planning. Beyond efforts toward project management and reporting, eight additional project tasks are focused on the development of the Energy-Water DSS. The initial foundation for this tool is Sandia National Laboratories (Sandia) Energy-Power-Water Simulation (EPWSim) model. This existing framework provides an interactive environment for exploring trade-offs, and "best" alternatives among a broad list of energy/water options and objectives. The framework currently supports prototype modules for calculating thermoelectric power demand and related water use; water demand from competing use sectors; surface and groundwater availability, and; an energy for water calculator. Each of these modules will be updated and expanded, while additional process modules will be added.
- c. Other Sandia expertise (Mike Hightower, Howard Passell, Elizabeth Richards): Energy, Power & Water Simulation Model, Virtual Water Market Model

Interest in "water, energy, climate, adaptation" from potential Latin American collaborators:

COLSON, UNAM, Pontificia Univ. Católica Chile, others?