

**Proposal for the
Penn State Center for Energy and Environmental Economics and Policy (CEEPP)**

Submitted to the Earth and Environmental Systems Institute

By

Seth Blumsack and Karen Fisher-Vanden (Co-Directors)

April 17, 2017

List of Participating Faculty

In its present incarnation, the activities of the Energy and Environmental Economics and Policy Initiative (EEEPI) have involved more than twenty faculty members in the Colleges of Earth and Mineral Sciences; Agricultural Sciences; Engineering; and Business, along with more than two dozen graduate students and postdocs. The most active faculty participants are listed below.

- Jennifer Baka, Geography
- Seth Blumsack, Leone Family Department of Energy and Mineral Engineering
- Karen Fisher-Vanden, Agricultural Economics, Sociology and Education
- Andrew Kleit, Leone Family Department of Energy and Mineral Engineering
- James Shortle, Agricultural Economics, Sociology and Education
- Mike Jacobsen, Ecosystem Science and Management
- Marc McDill, Ecosystem Science and Management
- Zhen Lei, Leone Family Department of Energy and Mineral Engineering
- Uday Shanbhag, Industrial and Manufacturing Engineering
- Mort Webster, Energy and Mineral Engineering
- Douglas Wrenn, Agricultural Economics, Sociology and Education
- George Young, Department of Meteorology
- Kate Zipp, Agricultural Economics, Sociology and Education

Rationale for the Proposed Center

The Energy and Environmental Economics and Policy Initiative (EEEPI) was created in 2011 to unite a community of scholars at Penn State that has world-class talent, but has historically remained unfortunately fragmented. Initial support was provided by EESI and PSIEE, and EEEPI has partnered with other Institutes and Centers on campus to jointly sponsor activities. These partners have included the Center for Climate Risk Management (CLIMA); Environment and Natural Resources Institute (ENRI); and EMS Energy Institute. EEEPI's activities have included:

- Establishment of a weekly seminar series featuring both internal and external speakers that has been well-attended by both graduate students and faculty (most seminars have had at least 20 attendees);
- Holding several “small grant” competitions aimed at helping PhD students and pre-tenure faculty build and promote their research through support for travel, data or other research-related materials;
- Sponsoring meetings to plan joint research projects;
- Providing a platform for the organization of a new inter-college degree program in Energy, Environmental and Food Economics, with a planned launch in Fall 2017;
- Contributing to energy policy as one of the pillars of President Barron's “Energy University” Initiative.

Why Continue this Initiative?

Over the past six years EEEPI has been a successful platform for building a University-wide community in energy and environmental economics, particularly among faculty with interests in interdisciplinary research. It has helped students and pre-tenure faculty advance and promote their research, and as such has become a focal point on campus for the study of economics and policy related to energy and environmental resources and systems. We are one of the few places in the world that does both “energy” and “environment” well, and even with modest funding the Initiative can help to maintain this joint community and contribute to it becoming stronger.

As an “Initiative,” EEEPI has historically focused largely on community-building activities and has achieved some notable successes over the past three years in particular. These include the new inter-college doctoral program in Energy, Environmental and Food Economics; a major multi-year award from DOE focused on multi-scale modeling of food, energy and water systems under climate stressors; and an award from the NSF CRISP program focused on coupled infrastructures. Of the four specific funding areas we identified in our last renewal grant, we have achieved some success in three of them (the two mentioned above plus a smaller grant from the Sloan Foundation focused on technological transitions in clean energy).

In the past we have requested and received supplementary funding commitments from the Environment and Natural Resources Institute (ENRI) and PSIEE. ENRI has agreed to continue

its support of the initiative and PSIEE will as well, contingent on some support from EMS. We have also co-funded some seminar speakers with the Initiative for Sustainable Electric Power Systems and will do more of this in the future.

After six years and multiple successes, it is reasonable to ask what the value of EEEPI will be in the future. The reason is simple: we have built a model for the promotion of a robust interdisciplinary cross-campus research community that works. Our weekly seminar series continues to provide an indispensable focal point for faculty, postdocs and students from multiple Colleges to see each other on a regular basis. EEEPI has served as a platform for research development in targeted areas, and we would like to see it continue to enable future successes. As the Energy University initiative ramps up over the next few years, we see EEEPI continuing to provide a service of assembling talent that ordinary funding awards cannot provide. We acknowledge that after six years of operating in more or less the same way, it is time to assemble the primary participating faculty to see what activities we should do more of, and in particular how we can increase our collaborative activities beyond those mentioned in the targeted areas.

Potential Funding Opportunities

Penn State faculty who would be affiliated with EEEPI have been highly successful in competing for large grants in which energy and environmental economics and policy play a central role. Many of these opportunities do not arise in the form of regular solicitations, but are issued by a variety of funding agencies in response to emerging energy or environmental issues.

A few examples of programs that will be emphasized include:

- NSF's INFEWS program targets an area (food/energy/water systems modeling) in which faculty active in EEEPI have built tremendous capabilities over the past three years. One EEEPI Co-Director (Fisher-Vanden) is the PSU PI on a large multi-institution grant from DOE focused on multi-scale integrated assessment for food/energy/water systems.
- EEEPI faculty, in conjunction with other faculty from EMS and from Penn State Law, have submitted a proposal to the President's office to fund a study of the effectiveness of proposed regulations on methane and other air emissions from natural gas operations. This may be funded as a pilot under the Energy University initiative; if not we plan to target non-profits or foundations such as EDF.
- Following up from the EESI foundation and philanthropy workshop in 2016, we have started cultivating a relationship with the Alfred P. Sloan Foundation, which now has a dedicated energy program.
- The CRISP program currently run by the National Science Foundation. The Center Co-Director (Blumsack) was part of a successful CRISP proposal that runs through 2019 and was targeted in a previous incarnation during the last EEEPI funding cycle.

Center Needs

The purpose of EEEPI is to catalyze and organize research efforts across the university to propel Penn State into a position of national and international leadership in energy and environmental economics and policy. We primarily seek funds to maintain our community-building activities (such as the seminar series) and to provide modest support for group of Center affiliates to collaborate on proposals in response to the opportunities listed above as well as others that may arise. We request \$5,000 total over three years from EESI and expect to have at least as much in matching support from ENRI, PSIEE and the EMS Energy Institute through the Initiative for Sustainable Electric Power Systems.

EEEPI is not requesting space at this time, although administration of some of our activities leverages space already provided by EESI for the support of SCRiM and Karen Fisher-Vanden's new DOE award.

Management Structure

EEEPI will be headed by two faculty directors from two different Colleges, Karen Fisher-Vanden and Seth Blumsack. The directors will be in charge of approving expenditures and overseeing Center activities. To involve some faculty more deeply in the Center, particularly pre-tenure faculty, we envision nominating individual faculty (other than the Co-Directors) to run the seminar series in each semester and to come up with themes for the seminars, where appropriate. Examples of representative theme areas might include unconventional natural gas development; renewable electricity generation; ecosystem services, and so forth. The co-directors see one another on at least a weekly basis and will meet additionally as needed to discuss EEEPI issues. Under EEEPI, the co-directors have set and maintained expectations that affiliate faculty will need to be active participants in Center activities (such as seminars or other meetings) in order to be viewed as competitive for grad-student funding, seed-grant opportunities or administrative support with proposal management.

EEEPI Activities in the Past Three Years

EEEPI has managed a budget of \$10,000 over the past three years, which combines support from EESI, ENRI and PSIEE.

Past Expenditures

The biggest expenditure areas for EEEPI between 2014 and 2017 have been in running the energy and environmental economics seminar series, and in running a small-grants program for EEEPI affiliate faculty and PhD students.

Energy and Environmental Economics Seminars: The seminar series has been a weekly event run regularly during the fall and spring semesters over the past six years (with occasional seminars during the summer, though attendance at these has been lower). Attendance has typically been around 25-30 participants per seminar and has been made up primarily of graduate students and faculty from Earth and Mineral Sciences, Agricultural Sciences and Engineering and College of Engineering. Between one-half and two-thirds of the seminar speakers have been Penn State faculty and graduate students (consistent with the community-building mission of EEEPI), but we have regularly invited outside speakers as well. Approximately 70% of EEEPI's total annual expenditures in each of the past three years has been to support the seminar series (food for participants and travel support for external speakers).

Small Grants for Travel and Research: A few times in the past three years (roughly once per year), EEEPI has issued a competitive open call for small-grant research support. These small-grant monies have been used to support travel to professional conferences and purchase of data or other research-related supplies. Typical grant sizes have been a few hundred dollars to several hundred, but in each grant competition the faculty selection committee has chosen a single 'best proposal' award that receives a higher level of funding. Awardees are asked to acknowledge EEEPI support in any conference presentations or papers that have been supported by this small grant competition, and also agree to present their supported research work at the energy and environmental economics seminar series. Approximately 20% of EEEPI's total annual expenditures in each of the past three years has gone to these small-grant awards.

Programmatic or Proposal Planning: EEEPI has supported (largely through food purchase) meetings of Center affiliates to discuss proposal-writing opportunities or other areas of collaboration. Approximately 5% of EEEPI's budget has gone towards these activities. A few such examples include meetings for planning a new inter-college graduate program; and work on proposals for the recently-funded jet fuel Center of Excellence (ASCENT, funded by FAA and led by Washington State University).

Benefits to EMS and Penn State

EEEPI's successes in its first six years of operation have largely come through increased coordination and collaboration among economists in four different departments across three Colleges at Penn State; integration of science and engineering into economics research; increased visibility for our research work; and participation of EEEPI affiliates in funded grant proposals.

- EEEPI has served as a platform for the development of a new inter-college graduate program in Energy, Environmental and Food Economics.
- Leveraging funding from grants and individual student advisor support, over the past three years the EEEPI small-grants program has sponsored the following:
 - Four conference presentations at the American Economic Association annual meeting;
 - Five conference presentations at the Energy Economics Association annual meetings;
 - Two conference presentations at the IEEE Power and Energy Society general meeting;

Support for this conference travel has also been instrumental in the success of our PhD students finding jobs after graduation.

- EEEPI affiliates have continued to be successful in grant-writing and the number of proposals with the names of multiple affiliates is growing. Multiple EEEPI affiliates participated in a Sustainability Research Network proposal that made it to the final down-select round (involving a reverse site visit) but unfortunately was not funded. Important awards in food/energy/water systems and coupled energy infrastructures are examples of recent successes in targeted areas over the past three years.
- The EEEPI Co-Directors served on a working group to advise President Barron in formulating a vision for energy policy research at Penn State as part of his Energy University initiative. A major theme in the group's report to President Barron was that Penn State needs to maintain strength in energy and environmental economics for any energy policy initiative to succeed. Pending approval from the President's office, one of the EEEPI Co-Directors (Blumsack) will work with faculty from EMS and Penn State law on a pilot research project to show the interdisciplinary capabilities of Penn State faculty in evaluating policy options to address air emissions from natural gas operations.

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Email: sab51@psu.edu
<http://www.personal.psu.edu/sab51>

Education and Training

B.A., Mathematics and Economics, Reed College (1998).
M.S., Economics, Carnegie-Mellon University (2003).
Ph.D., Engineering and Public Policy, Carnegie-Mellon University (2006).
Postdoctoral Research, Carnegie-Mellon University (2006-07).

Research and Professional Experience

Associate Professor (2013 – present) and Assistant Professor (2007 – 2013) Leone Family Department of Energy and Mineral Engineering, The Pennsylvania State University.
Program Chair, Energy Business and Finance (2014 – present)
Associate Head, Leone Family Department of Energy and Mineral Engineering (2016 – present)
Consulting Economist, Economic Insight, Inc., 1998 – 2001.

Ten Recent Publications (out of 48 total since 2007)

1. Borraz-Sanchez, Conrado, Russell Bent, Scott Backhaus, Seth Blumsack and Pascal van Hentenryck, 2016. “Convex Optimization of Joint Natural Gas and Electric Power Planning,” *Proceedings of the 49th Hawaii International Conference on System Sciences*, Poipu, HI, January 2016.
2. Sahraei-Ardakani, Mostafa and Seth Blumsack, 2016. “Transfer Capability Improvement through Market-Based Operation of Series FACTS Devices,” *IEEE Transactions on Power Systems* 31:5, pp. 3702-3714.
3. P. Hines, S. Blumsack, M. Schlapfer, 2016. Centralized versus Decentralized Infrastructure Networks, in review, *IEEE Transactions on Smart Grids*. Pre-print available at <http://arxiv.org/abs/1510.08792>.
4. A. Kleit, C. Lo Prete, S. Blumsack, N. Guo, 2015. “Welfare Analysis of Natural Gas Pipeline Expansion,” under review, *Journal of Regulatory Economics*. Pre-print available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2638445.
5. L. Ayala and S. Blumsack, 2013. The Braess Paradox and its Impacts on Natural Gas Network Performance. *Oil and Gas Facilities* 2:3, pp 54-62.
6. C. Barrows and S. Blumsack, 2012. Transmission Switching in the IEEE RTS-96 Test System, *IEEE Transactions on Power Systems* 27:2, pp. 1134-1135.
7. E. Cotilla Sanchez, P. Hines, C. Barrows, S. Blumsack, 2012. Comparing the Topological and Electrical Structure of the North American Electric Power Infrastructure. *IEEE Systems Journal* 6:4, pp. 616-626; doi: 10.1109/JSYST.2012.2183033.
8. P. Hines, E. Cotilla-Sanchez, S. Blumsack, 2010. Comparing three models of attack and failure tolerance in electric power networks, *Chaos* 20, 033122. Available online at <http://scitation.aip.org/content/aip/journal/chaos/20/3/10.1063/1.3489887>.

9. S. Blumsack and A. Fernandez, 2012. Ready or not, here comes the smart grid, *Energy* 37:1, pp. 61-68; doi:10.1016/j.energy.2011.07.054.

10. A. Newcomer, S. Blumsack, J. Apt, L. B. Lave and M. G. Morgan, 2008. The Short Run Economic and Environmental Effects of a Carbon Tax on U.S. Electric Generation, *Env. Sci. Tech.*, 42, 3139-3144; dx.doi.org/10.1021/es071749d.

Service and Synergistic Activities:

1. *Research:* Blumsack is the John T. Ryan Jr. Faculty Fellow in the College of Earth and Mineral Sciences. He serves as Co-Director, Center for Energy and Resources Policy and Economics; External Faculty, Santa Fe Institute; Adjunct Research Professor, Carnegie Mellon Electricity Industry Center;
2. *Editorial:* Associate editor for *Journal of Unconventional Oil and Gas Resources* and *Journal of Energy Engineering*, Reviewer for *Environmental Science and Technology*, *Environmental Research Letters*, *Energy*, *Energy Policy*, *IEEE Transactions on Power Systems*, *Energy Journal* and *Journal of Regulatory Economics*.
3. *Educational:* Program Chair, Energy Business and Finance, Penn State University; Associate Department Head, Penn State University; External advisor for the petroleum engineering program, University of the West Indies.
4. *Advisory:* Service on proposal review panels for NSF, DOE and Alfred P. Sloan Foundation; Member of EPA peer review panel for energy intensity indicators; External advisor for the EPSCoR program in wind energy at the University of Wyoming.

Recent Grants and Awards

“CRISP: Computable Market and System Models for Coupled Infrastructures”

Funding Agency: National Science Foundation

Amount: \$177,596

PI: Seth Blumsack

Period: 9/1/16 – 8/31/19

Annual Support: 0.5 person-month

“Cyber-SEES: Climate-Aware Renewable Hydropower Generation and Disaster Avoidance”

Funding Agency: National Science Foundation

Amount: \$227,980

PI: Seth Blumsack

Period: 9/15/13 – 8/31/16

Annual Support: 0.5 person-month

“Collaborative Research: Transforming Power: Regional Transmission Organizations Managing Tension and Networking Innovation”

Funding Agency: National Science Foundation

Amount: \$144,470

PI: Seth Blumsack

Period: 9/1/13 – 8/31/16

Annual Support: 0.5 person-month

Karen Fisher-Vanden

Department of Agricultural Economics, Sociology and Education, The Pennsylvania State University,
113 Armsby Building, University Park, PA 16802, 814-867-2752

Education and Training

University of California, Davis, CA	Mathematics/Computer Science and Economics	B.S.	1985
University of California, Davis, CA	Mathematics/Computer Science and Economics	B.A.	1985
University of California, Los Angeles, CA	Anderson Graduate School of Management, Management Science	M.S.	1990
Harvard University, Cambridge, MA	Public Policy (Major Field: Environmental and Resource Economics and Policy)	Ph.D.	1994-1999

Research and Professional Experience

2014-	Professor of Environmental and Resource Economics, Pennsylvania State University
2008-2014	Associate Professor of Environmental and Resource Economics, Pennsylvania State University
2007-2008	Associate Professor (with tenure) of Environmental Studies, Dartmouth College
1999-2007	Assistant Professor of Environmental Studies, Dartmouth College
2003-2005	Research Scholar, Rockefeller Center for the Social Sciences, Dartmouth College
1997-2001	Research Fellow, Center for Business and Government—Program on Technology and Economic Policy, John F. Kennedy School of Government, Harvard University.
1996-1997	Research Fellow, Belfer Center for Science and International Affairs, John F. Kennedy School of Government, Harvard University.
1997	Visiting Researcher, International Institute for Applied Systems Analysis (IIASA)—Laxenburg, Austria.
1992-1994	Senior Research Scientist, Global Climate Change Group, Battelle, Pacific Northwest National Laboratories, Washington, DC.
1991-1992	Air Quality Specialist, Socioeconomic Analysis Group, South Coast Air Quality Management District, Los Angeles, CA.
1990-1991	Senior Consultant, The WEFA Group, Burlington, MA.
1989-1990	Research Assistant, UCLA Business Forecasting Project, Los Angeles, CA.
1985-1988	Software Support Engineer, Hewlett-Packard Company, Sunnyvale, CA.

Publications

- Olmstead, S., Fisher-Vanden, K., and Rimsaite, R. (2016). "Climate Change and Water Resources: Some Adaptation Tools and Their Limits." *Journal of Water Resources Planning and Management*, 10.1061/(ASCE)WR.1943-5452.0000642, 01816003.
- Fan, Q., A., Klaiber, K. Fisher-Vanden, "Does Extreme Weather Drive Interregional Brain Drain in the U.S.? Evidence from a Sorting Model," forthcoming, *Land Economics*.
- Butler, M., P. Reed, K. Fisher-Vanden, K. Keller, T. Wagner, 2014, "Identifying parametric controls and dependencies in integrated assessment models using global sensitivity analysis," *Environmental Modelling and Software*, 59:10-29.
- Fisher-Vanden, K., I. Sue Wing, E. Lanzi, and David Popp, 2013, "Modeling climate change feedbacks and adaptation responses: recent approaches and shortcomings," *Climatic Change*, DOI: 10.1007/s10584-012-0644-9.
- Sue Wing, I., and K. Fisher-Vanden, 2013, "Confronting the challenge of integrated assessment of climate adaptation: a conceptual framework," *Climatic Change*, 117:497-514, DOI 10.1007/s10584-012-0651-x.
- Fisher-Vanden, K., E. Mansur, and Q. Wang, 2015, "Electricity Shortages and Firm Productivity:

- Evidence from China's Industrial Firms," *Journal of Development Economics*, 114: 172–188.
7. Fisher-Vanden, K. and K. Thorburn, 2011, "Voluntary Corporate Environmental Initiatives and Shareholder Wealth," *Journal of Environmental Economics and Management*, 62(3): 430-445.
 8. Fisher-Vanden, K. and M.S. Ho, 2010, "Technology, Development, and the Environment." *Journal of Environmental Economics and Management*, 59: 94-108.
 9. Fisher-Vanden, K., and M.S. Ho. 2007. "How Do Market Reforms Affect China's Responsiveness to Environmental Policy?" *Journal of Development Economics*, 82, 200-233.
 10. Fisher-Vanden, K., G. Jefferson, H. Liu, and Q. Tao, 2004 "What is Driving China's Decline in Energy Intensity?" *Resource and Energy Economics*, 26(1), 77-97.

Synergistic activities

1. 2010-2013 Lead Author, IPCC Working Group III, Fifth Assessment Report.
2. 2015- Member, Science Advisory Board, US Environmental Protection Agency
3. 2013 Expert Review Panel, Risky Business Project, Bloomberg Philanthropies, Office of Hank Paulson, and Next Generation.
4. 2012-2015 Review Panel, National Science Foundation, Decision, Risk and Management Sciences Program
5. 2006-2009 Member, U.S. Climate Change Science Program, Product Development Advisory Committee.

Identification of Potential Conflicts of Interest or Bias in Selection of Reviewers

Collaborators and Co-Editors (14): Chris Forest (PSU), Steve Frolking (UNH), Mun Ho (Resources for the Future), Gary Jefferson (Brandeis University), Klaus Keller (PSU), Richard Lammers (UNH), Erin Mansur (Dartmouth College), David Popp (Syracuse University), Patrick Reed (Cornell), James Shortle (PSU), Ian Sue Wing (Boston University), Mort Webster (PSU), John Weyant (Stanford University), Douglas Wrenn (PSU).

Graduate Advisors (4): William Hogan (Harvard University), Adam Jaffe (Brandeis University), Dale Jorgenson (Harvard University), Robert Stavins (Harvard University).

Thesis Advisor and Postgraduate-Scholar Sponsor (7): Meri Davlasheridze (Texas A&M), Qin Fan (Fresno State University), Guanze He(unknown), Yong Hu (Zhejiang Gongshang University), Isabella Notar (Mount St. Mary's University), Katherine Schu (unknown), Juliana Wang (USC).

Number of graduate students advised: (7)

Postdoctoral Scholars Sponsored: (1)

----- Forwarded Message -----

Subject:Support for EESI funding

Date:Mon, 17 Apr 2017 17:37:39 -0400 (EDT)

From:Lara Fowler <lbf10@psu.edu>

To:SUSAN LOUISE BRANTLEY <sxb7@psu.edu>

CC:Seth Blumsack <sethb@psu.edu>, Karen Fisher-Vanden <kaf26@psu.edu>

Sue-

I'm writing to offer my support for EESI funding for the Energy & Environmental Economics and Policy Initiative (EEEPI) for another three year term. This initiative has been bringing in both internal and external speakers on important topics, and has served as a good place to bring internal faculty and staff together. In doing a presentation in February on flood insurance, I was impressed by the diversity in the audience, and the range of discussions and questions afterwards.

In addition, questions of economics and policy are only becoming more and more important, both within Penn State and beyond. As we engage in the discussions about how to implement the Penn State strategic plan, these topics come up time and time again: how can Penn State better engage in this space, and ensure an impact on the ground? As co-chair of the subcommittee tasked with the strategic pillar of "Stewarding our planet's resources", the input of EEEPI-related faculty will continue to grow. I've worked closely with Seth on a working group on how policy might be incorporated in President Barron's vision of "energy university" and with Karen on a DOE funded project; I have no doubt about either of their leadership or ability to make things happen. Wearing both of my hats-- at Penn State Law, and with the Institutes of Energy and the Environment-- I'm more than happy to recommend funding.

I'm happy to answer any questions you might have.

Lara Fowler
Senior Lecturer, Penn State Law
Assistant Director for Outreach & Engagement
Penn State Institutes of Energy and the Environment
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17 April, 2017

Dear Seth,

I am writing in support of your proposal to continue the Energy and Environmental Economics and Policy Initiative (EEEPI). I am interested in collaborating on the topic of evaluating regulatory policies to manage greenhouse gas and other air emissions from natural gas operations. My research group has devoted considerable effort to quantify greenhouse gas emissions from a wide variety of sources. This would be an excellent opportunity to explore the connections between our technical expertise in emissions quantification and potential regulatory policies. This could easily expand into venues such as urban emissions, and ecosystem greenhouse gas sequestration, both of which are also important topics in greenhouse gas management.

best wishes,

Kenneth J. Davis
Professor of Atmospheric and Climate Science
Department of Meteorology and Atmospheric Science

Email: kjd10@psu.edu

Phone: 1-814-863-8601



Environment and Natural Resources Institute

The Pennsylvania State University
111 Ferguson Building
University Park, PA 16802-5600

April 18, 2017

Susan Brantley
Director, Earth-Environmental Systems Institute
Distinguished Professor
2217 EES Building
University Park, PA 16802

Dear Sue:

I want to express my enthusiastic support the Energy and Environmental Economics and Policy Initiative (EEEPI) and strongly endorse Seth's request for continued funding. I applaud EEEPI's accomplishments and continue to see EEEPI as an excellent investment for EMS and PSU.

EEEPI is among the most effective community building initiatives I have seen at Penn State. It has succeeded in bringing together routinely faculty and students from across the university who are interested this strategically important topic domain from multiple disciplinary perspectives. Underpinning the success has been one of the most successful seminar series I knows at PSU, with well attended weekly presentations by students, PSU faculty, and distinguished visitors. There have been significant spillovers. Theses include joint research projects, successful funding proposals, and innovative student research guided by multidisciplinary committees, and multidisciplinary learning.

I also credit EEEPI community building and leadership to helping to provide the interest, trust, enthusiasm, and coordination needed to develop the new Intercollege Graduate Degree Program in Energy, Environment, and Food Economics. I see the EEEPI community as a key element in fostering the growth of the EEFÉ program into a premier graduate program for future training energy, environmental, and food economists. This program, which will be one of the largest in the country, will provide much better visibility for economists on campus working in the food/energy/water nexus, and will also highlight the commitment of this group of economists to interdisciplinary research involving engineering, ecosystem science and earth science. The graduate program activity in particular is something that had been discussed for many years but never came to fruition because a scattered group of faculty had little experience working with one another. That has changed in the six years that EEEPI has been in existence, and it has signaled a real commitment among the faculty and support from the research institutes to build a successful cross-campus research community.

Given the significant involvement of College of Agriculture Sciences faculty in EEEPI, and the value it provides them and the College, I am willing to commit resources from the Environment and Natural Resources Institute (ENRI) to EEEPI as I have in the past (\$2000/year/3 years).

All the best,
Jim

A handwritten signature in black ink that reads "James Shortle". The signature is written in a cursive style with a large, stylized "S" at the end.

James S. Shortle
Distinguished Professor of Agricultural and Environmental Economics
Director, Environment and Natural Resources Institute