Duke Energy Renewables Innovation Fund
Grant Competition: Call for Proposals

NEW PROPOSAL DEADLINE: Thursday, January 5, 2017

With funds provided by Duke Energy Renewables, Inc. (DER), the GW Sustainability Collaborative announces the second annual competition for interdisciplinary teams of GW faculty to compete for research funding. The total funds available are $90,000 and the number of awards will depend on the quality of the applications. The projects should focus on energy research. All energy topics are possible; faculty are encouraged to consult the list of suggested topics below or contact Sustainability Collaborative Research Director Robert Orttung (rorttung@gwu.edu) to discuss possible proposal topics to be sure that they are appropriate for this competition. The interdisciplinary team projects may include the assistance of GW students and staff, and other collaborators, as appropriate. Three kinds of grants may be awarded.

Research Grant. Awards will support novel research ideas that address energy sustainability issues and show the greatest promise.

Planning Grant. Awards will support work to develop competitive grant proposals in response to U.S. government solicitations. These grant awards are a strategy to leverage the significant U.S. federal government investment in energy-related research.

Living Lab Grant. Awards will support collaborative research on the Capital Partners Solar Project (see below) conducted by teams of faculty, students, and staff. Associated activities may include, but are not limited to, field trips to the solar farm sites in North Carolina and DER headquarters, various kinds of data analysis, and the development of case study materials.

Information about Last Year's Winners and the DER Innovation Fund

For GW Today stories describing the winners of the 2015 competition and the origins of the DER Innovation fund, please see the following links:
Meet the Inaugural Duke Energy Renewables Innovation Fund Awardees
University Announces Capital Partners Solar Project

The 2016 Duke Energy Renewables Innovation Fund Solicitation

A. Proposal Timeline
Proposals are currently being accepted. The deadline for submission of the full proposal is 5 p.m. Thursday, January 5, 2017. Award decisions are expected by the middle of January. To submit a proposal for consideration, email the proposal and supporting
documents to the GW Sustainability Collaborative at the following address: sustainability@gwu.edu.

B. Eligible Applicants
Only GW faculty members are eligible to serve as the principal investigator for proposed projects. Co-principal investigators and other contributors to the project may include staff and students and team members may be drawn from institutions beyond GW.

C. Interdisciplinary Requirement
To be considered for a research or planning grant award, proposals must include an interdisciplinary research team. Such a team could include faculty from engineering, physical sciences, social sciences, the humanities, and schools of public policy, business and education. Creative and unexpected combinations are encouraged.

D. Selection Process
A Committee consisting of DER and GW leaders will examine the proposals. This Committee will select the winning proposals and determine the amount of the awards, based on the quality, novelty, and relevance of the submissions.

E. Available Funding and Anticipated Number of Grants
The Committee will award up to $90,000 in the 2016 cycle. The dollar amount per award and the number of overall awards made will depend on the needs of the projects selected and other factors (including the number and quality of the proposals submitted) as the Committee determines relevant and appropriate. Proposals can be up to $90,000 and the committee will decide how to divide the funds among one or more grants based on the quality of the proposals.

F. Duration of Grant
Funding will be for one-year projects. If the proposed research is multi-year, then a defined one-year component of the work must be identified, with a one-year deliverable that meets the objectives of the Fund. Multi-year proposals should include a discussion of the impact on and value of the project if funding is not renewed.

G. Research Topics
The 2015 competition will accept proposals for research, planning, and living lab grants. In 2016, the Committee has chosen to provide faculty maximum opportunity to submit innovative energy-related research ideas. For this reason, there are no restrictions on what research topics may be proposed – all submissions will be fully evaluated. However, to facilitate faculty understanding of the range of research opportunities and to facilitate brainstorming of potential research ideas, the Committee had developed the following topic list for consideration.

- Analysis and recommendations for solutions to remove barriers to expanded use of renewable energy and storage. Expanding use of renewable energy and storage to the levels necessary to halt climate change requires adaptation across the electrical power system, from changes in regulations and market rules to facilitate market entry...
and cost-recovery to increasing the investment in communication and control systems to provide the faster response times and finer levels of control needed as the system becomes more decentralized and more reliant on new technologies. Projects in this area might address these problems with a focus on a particular region, e.g., PJM, or the problems associated with a particular application, e.g., storage deployed on the distribution system. Work could include, for example, development of new engineering solutions coupled with analysis of the business case and legal hurdles associated with their deployment. Work could explore better understanding of the impacts of the increasing adoption of distributed energy resources, community solar, or microgrids on the operation of utilities.

- **Research to better quantify the impact of increased use of renewable energy and storage on energy systems, and to develop tools and policies to facilitate smart deployment of these technologies.** Policy decisions require consideration of a multitude of factors, which increasingly require quantification and allocation of the costs and benefits of a proposed action across multiple sectors. Thus, in order to develop smart policies that deliver the sustainability benefits that ratepayers and society value, attention must be given to several factors, including, but not limited to: (1) better means for measurement and assessment of the impact of renewable energy and storage on grid operations and reliability (including a systems engineering analysis of the impact of intermittent generation on reliability and emissions), (2) energy markets (3) public health, (4) land and water use, (5) air quality, and (6) consumer satisfaction. Consideration of who makes decisions, the authority of regulating bodies to engage in system planning and the allocation of costs and benefits across sectors is also of growing interest and concern, both in the industry and to experts.

- **Analysis of the landmark PPA, entered into by DER with GW, focused on the impacts large-scale renewable energy for retail buyers could have if replicated and scaled.** Research may include analysis of the Project implications for the energy market and society. Possible topics for research may include, but are not limited to, exploring the Project’s approach, customer or market demand, technical performance, energy grid impact, legal and regulatory enablers, public policy implications, environmental and public health benefits, and/or benefits to the economic development of the community, including benefits to agricultural enterprises. This type of project might include analysis that would help in understanding the impact of the magnitude of a Purchase Power Agreement of the size of the Capital Partners Solar Project on the industry, grid, and marketplace. Research could also provide public policy analysis of the issues associated with a major retail electricity customer soliciting bids for its future electricity supplies and its impact on other customers, the electric system and the future structure of the electric utility industry.

- **Policy research on tax investments to facilitate renewable energy adoption.** Federal tax policies have been a key driver of solar energy. Last year the 114th Congress extended the 30-percent investment tax credit (ITC) for solar and other clean energy technologies for an additional five years. While there is uncertainty about the
future of these tax credits once they expire, there is bipartisan support for a reformed credit that provides the industry the certainty it needs to continue to make investments until solar reaches price parity with historic energy sources. Objective analysis and development of policy alternatives to assist Congressional decision making are needed.

- **Research and analysis of strategies to achieve regulatory certainty for residential solar.** Residential solar would be largely uneconomic without net-metering laws and regulations that allow individual homeowners and business to use the electricity grid to balance their consumption patterns. Disputes over the costs and benefits of net-metering to homeowners, utilities, and our shared grid resources has led to costly nationwide battles between electric utilities and the rooftop solar industry in state utility commissions and legislatures as well as the governing boards of municipal and cooperative utilities. The conflict in the legislatures, regulatory commissions, and now the courts, makes for a chaotic and polarizing process and market. Businesses deploying solar energy need sensible, workable regulations and regulatory certainty in order to continue meeting market demand and shareholder expectations.

- **Simulation of responses to Best Management Practices on watershed nutrient loading.** GW has been working with EPA and other federal agencies and NGOs to plan for the development of a simulation model to correlate emplacement of BMPs with reductions in watershed nutrient loading in order to facilitate water quality trading. One of the industrial sectors potentially benefiting the most from this proposed research is the electric power industry due to its implications for Title V air quality permits. Watershed-based nutrient trading offers strong promise to be the least expensive way for the electric power industry to deal with limitations on airborne NOx emissions in an environmentally sound manner. The envisioned project includes determination of watershed model boundaries, formulation of guidelines for sensor system deployment, determination of monitoring metrics to assess site performance, specification of a fate and transport model for phosphates and nitrates within watersheds based on efficiencies of particular BMPs, and determination of the sensor sensitivity and specificity for particular BMPs. GW’s work in this area is being closely coordinated with EPA’s Nutrient Sensor Challenge.

- **Research on development of sustainable technologies for manufacturing that reduce energy use and the production of toxic byproducts.** Fossil fuels, which are extensively used for the production of carbon-based chemicals and materials, are being rapidly depleted by the increase of global populations and expanding energy-intensive economies around the world. Green or sustainable chemistry is chemical research and engineering that aims to prevent pollution at the source and use renewable resources, including energy.
• **Research on community attitudes and/or responses toward renewable energy installations.** Some communities readily embrace wind and solar sites while other communities do not. Better understanding and articulation of community perceived concerns and benefits that may accompany renewable energy sites, such as wind and solar farms is needed. Exploration of attitudes/responses to “renewable energy,” “clean energy” and “energy efficiency” that helps illuminate challenges and opportunities for the industry is needed. Environmental justice impacts and community amenities need documentation. Comparative analysis between impacted communities that help identify key factors that foster community acceptance of renewable energy sites would help advance the industry.

• **Research on the impact of renewable energy on wildlife.** Wind and solar arrays exist in natural habitats home to wildlife. Research needed includes: work that leads to improved strategies for mitigation of bird and bat species disruption that may arise from wind energy; understanding the potential wildlife benefits from solar and wind sites, particularly strategies for establishment of wildlife corridors that simultaneously aid wildlife and protect renewable energy equipment; and examination of the impact of the potential expansion of the Endangered Species Act on renewable energy.

• **Research on the impact of solar and wind farms on soil health.** Many solar and wind installations sit on land once cultivated for agricultural purposes. Research on the potential conservation benefits of long-term leases of land for renewable energy, particularly on soil health, has not been undertaken. The USDA Conservation Reserve Program (CRP) pays farmers to remove fragile land from production and provides private landowners an annual payment for a minimum contract period of 15 years for leaving land fallow. A 25-40 year renewable energy lease of agricultural land for wind or solar may be expected to provide similar conservation benefits to the CRP.

• **Research to enhance the safety of renewable energy.** Worker health and safety issues of wind and solar energy are always a top concern. Enhanced strategies to address safety through appropriate building codes, product standards, and the use and disposal of hazardous chemicals in the manufacturing of renewable energy equipment is critical. Cybersecurity is critical to enhancing the security, resiliency, and reliability of the nation’s electric grid. Research and development of advanced technology to create a secure and resilient electricity infrastructure is needed as well as supporting the development of cybersecurity standards to provide a baseline to protect against known vulnerabilities.

**H. Proposal Guidelines**

1. **Proposal Content and Length**
   
   a. **Research Grant Proposal – 5,000 word limit**
Introduction. Include a clear statement of the goal(s) and supporting objectives of the proposed project. Summarize the body of knowledge or past activities that substantiate the need for the proposed project. All works cited should be referenced.

Rationale and Significance. Explain the rationale behind the proposed project. Describe the potential contribution to sustainability concerns. Any novel ideas or contributions that the proposed project offers should also be discussed in this section.

Approach. The activities proposed or problems being addressed must be clearly stated and the approaches and methodology to complete the work should be clearly described, noting the interdisciplinary nature of the project. This section must include the following: expected outcomes; the means by which results will be analyzed, assessed, or interpreted; how results or products will be used; pitfalls that may be encountered; limitations to proposed procedures; and a timeline for attainment of objectives and for production of deliverables with specific, measurable outcomes.

b. Planning Grant – 2,000 word limit
Include a brief discussion of the most essential components detailed above for a Research Grant, presenting enough detail to allow adequate evaluation. Describe how the Planning Grant will allow the applicant to become competitive for future funding. Identify where the applicant will seek funding and provide a timeline for submission.

c. Living Lab Grant – 2,000 word limit
The Association for the Advancement of Sustainability in Higher Education defines living laboratories as faculty and student collaborations utilizing university infrastructure and operations for multidisciplinary learning and applied research to advance sustainability. Describe how the proposed project is a living lab, the research or activity to be undertaken, and the learning objectives for students. Describe how the project relates to a specific GW class, if relevant and/or if it will be an offering under the course Sust. 3096, Directed Research. If the research for a living lab proposal relies upon information that is related to the business and/or legal terms of the Capital Partners Solar Project, a list of the data/information requested must be included.

2. Required Attachments

i. Budget
Provide a detailed budget that includes, at a minimum, all personnel percent time commitments and, if applicable, equipment purchases and travel (e.g., living lab classroom travel). Include resource needs for outreach/communications and student engagement. These grants will not be subject to university overhead.

ii. Key Personnel
Clearly describe the roles and responsibilities of the Principal Investigator, co-PI(s), collaborator(s), and other key personnel. Describe how personnel meet the requirement for an interdisciplinary team. Biographical sketches for key personnel should be attached and these sketches will not be calculated in the proposal word limit.
iii. Outreach/Communications Plan
Briefly describe how research findings will be shared through publications and meetings, keeping in mind the special opportunities afforded by GW and its DC location. For example:

- **Exclusive salon discussions** with key thought leaders and decision makers from academia, industry, government, and non-profit sectors.
- **Symposia and conferences** open to the public to share challenges and best practices emerging from the research.
- **Planet Forward productions** to help promote innovation and solutions with scientists, business leaders, advocates, students and government leaders ([www.PlanetForward.org](http://www.PlanetForward.org)). Planet Forward can serve as an interdisciplinary player in the communication and translation of science by engaging faculty and/or students to capture and communicate the nature of the innovation and, the significance of the research. This can be through social media (e.g. Twitter crowd-sourcing) or a more traditional media approach with video, discussion, podcast or text.

iv. Student Engagement
Student involvement is critical to the partnership between GW and DER. Provide a brief description of the ways GW students could participate in and enhance the research partnership. For example, students may participate as:

- **Research assistants** on the various projects, enabling students to obtain first-hand knowledge of the solar and utility industry, and to gain skills related to project finance, renewable energy technology, market dynamics, and legal and public policy context.
- **Social media participants** through Planet Forward ([www.planetforward.org](http://www.planetforward.org)) to promote innovation and solutions with scientists, business leaders, advocates, students and government leaders. The students would engage in cutting-edge journalism through video, on-line, and other media. Students tell the stories, apply journalistic/film standards to explore the ideas, the individuals, the challenges, the opportunities and the obstacles related to the research project. Students tell these stories to inform stakeholders, policymakers, contemporaries and the public with the goal of raising awareness of the project among students, academic institutions, and professional peers.
- **Classroom participants** in a living lab curricular exercise.
- **Other roles** such as interns and networking with DER managers and executives as appropriate.

I. Evaluation Criteria

a. **Merit of the Application**
1. Project objectives are clearly described and will facilitate long-range improvements in sustainability;
2. Expected results or outcomes are clearly stated, measurable, and achievable within the allotted time frame;
3. Proposed outreach/communications plan can reasonably be expected to communicate project results to an identified audience or stakeholder group; and

b. **Project Management**
1. Roles of key personnel are clearly defined;
2. The personnel team is interdisciplinary;
3. A clear plan is articulated for project management and assessing the effectiveness and impact of the project.

**Background Information**

The Power Purchase Agreement between George Washington University (GW) and Duke Energy Renewables, Inc. (DER) was a pioneering agreement, demonstrating an important way in which universities and private corporations can constructively partner to advance sustainability. GW and DER now have the opportunity to further that relationship by leveraging the world-class expertise of GW faculty and the innovative spirit and business and policy acumen of DER to advance research in sustainability. To this end, GW and DER have entered into a Memorandum of Understanding establishing the Duke Energy Renewables Innovation Fund.

**About the GW Sustainability Collaborative**
The GW Sustainability Collaborative is the administering entity for the Duke Energy Renewables Innovation Fund. The Collaborative coordinates GW sustainability efforts in education, research, public engagement, and practice to maximize impact and to leverage GW assets for positive environmental, social, and economic benefits. Through the Collaborative, GW is creating a more sustainable campus, fostering research and curricula in sustainability, and providing students with the skills and knowledge to contribute to a sustainable future.