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**Center for Advanced Power Engineering Research**

Solicitation for New Research Projects

Beginning in August, 2018

August 21, 2017

**Proposal Submittal Deadline: October 20, 2017**

Confidential: For use by CAPER members only

1. **Overview**

This research solicitation is intended for members of CAPER to form collaborative teams and submit research proposals that are consistent with the mission for CAPER which is to advance, develop and promote research related to the reliable and efficient management of the power grid, including modeling and analysis techniques for generation, transmission and distribution planning and operation with and without presence of renewable energy resources. Project proposals are expected to align with the stated four research theme areas: Power Delivery Infrastructure and Systems, Power Utilization and Energy Efficiency, Power Generation, Storage and Integration, Data Management, Analytics and Security and Energy Policy, Markets and Economics. Submitted proposals shall follow the guidelines provided in this solicitation. Any questions related to the project proposals can be directed to the Center Director or any one of the Site Co-Directors noted below:

Center Director: Dr. Johan Enslin – Clemson University

Site Co-Director: Dr. Badrul Chowdhury – UNC Charlotte

Site Co-Director: Dr. Mesut Baran – NC State University

You may also contact officers of the Industry Advisory Board noted below:

IAB Chair: Gregg Turbeville

IAB Vice-Chair: Joe Cordaro

Center Steering Committee Chair: Steven Whisenant – Duke Energy

Before submitting a project proposal, it is suggested that researchers and industry members attend the Research Planning Workshop held annually to promote discussions between universities and industry for the generation of research topics. At the end of this solicitation are several suggested research topics. In addition, university researchers and industry members can send descriptions of research topics to the Center Director, Dr. Johan Enslin, for consideration.

1. **Requirements for Research Proposals**

**Submittal Deadline:** October 20, 2017, by mid-night local time of project leader

**Eligibility:** Research proposals may be submitted by researchers at CAPER Universities who are not on any project team that has a late outstanding CAPER final project report unless approved by the Center Director. Adjunct researchers may be members of a project team but cannot serve as a Project Team Lead.

**Evaluation Criteria:** The following criteria will be used by the Industry Advisory Board (IAB), the Center Steering Committee and the Center Director to review, prioritize and select proposals for funding.

## Industry Issues:

* + 1. Does the proposed project have at least one Industry Advisor from the industry membership?

1. Does the proposed project have application to the industry?
2. Is the project relevant to the needs of the industry?
3. Center Issues:
   * 1. Does the Project Proposal align with the solicitation?
     2. Are there multiple researchers from at least two different universities?
4. Quality:
5. Is the proposed project innovative and creative?
6. Does the Project Team have good past records?
7. Are the deliverables relevant and applicable?
8. Budget and Equity Issues:
   1. Does the Project contain equitable university funding requests?
   2. Is the budget in line with the scope of the work, typically $50,000 per project?
   3. Does the Project contribute to the balance between basic vs applied research?
   4. Does the proposed project support CAPER’s vision to educate students by including them in the project?
   5. Does the proposed project have one Project Leader and at least one researcher from another university?

**Project Duration:** A Project should not span more than two years. A typical project will run August 1, 2018 to August 31, 2020. Funding will be provided once sufficient industry membership support has been received at the Lead University. Final Reports are due at the end of the project period (typically December 31, 2020). Industry Advisors must review each Final Report before it is submitted.

**Funding Period:** Selected Projects begin as soon as funds are available and funding is on a calendar basis.

**Budget for New Projects:** The number of projects that will be funded for 2018 will be determined by the number of industry members that have executed industry membership agreements and have delivered the funds to CAPER by June 1, 2018.

**Projects per Researcher:** Typically CAPER will fund one new project each period for a researcher as the Project Lead or as a Project Team member. If a researcher ison the team of more than one selected proposal, then that researcher should expect a reduction in funding of $5,000 per project per funding year.

**Project Budgets**: The typical budget for a single project is $ 50,000 per funding year. Project Team Leads are typically budgeted at 40% of the total amount awarded and other members of the Project Team share in the remainder.

**Research Themes:** Each proposal must designate one of the designated four research focus areas. Proposals are discouraged from crossing over multiple research themes.

**Industry Advisors:** Each proposal must have at least two Industry Advisors. Researchers are encouraged to invite all industry members to become advisors for a project by sending an email to the CAPER Industry Members contact list. Contact the Center Director for the Industry contact list.

**Proposal Length:** Proposals shall not exceed five pages including all references and budget information.

**Proposal Format:** All proposals must be submitted in the CAPER Project Proposal Template. The template can be obtained from the Center Director.

**Proposal Submissions:** All proposals shall be submitted to the Center Director:

Dr. Johan Enslin – Clemson University

Email: [jenslin@clemson.edu](mailto:jenslin@clemson.edu)

2017 CAPER Research Proposal Submittal, Review and Approval Schedule

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| --- | --- |
| Date | Action Items |
| August 7-8 | 2017 Research Planning Workshop in Asheville, NC |
| August 24 | 2017 CAPER Research Solicitation distributed |
| October 20 | Proposals due to Center Director |
| October 27 | Proposals reviewed by Center Steering Committee |
| November 3 | Center Director sends selected Proposals to IAB members for review and evaluation |
| November 9-10 | Presentations made on selected proposals at IAB meeting |
| December 1 | Proposal reviews due to Center Director |
| December 8 | IAB makes recommendations on Proposals to Center Steering Committee |
| December 15 | Center Steering Committee makes final selections |
| March , 2018 | Center Director notifies Project Leads of selected proposals |
| June 1, 2018 | Funds for selected Projects are made available |

# Research Themes - CAPER’s primary research focus areas are:

**Power Delivery Infrastructure and Systems**

This research focus deals with the impacts that an increasing penetration of distributed generation resources and a desired resiliency to extreme weather events have on the power delivery system.

**Power Utilization and Energy Efficiency**

This research focus deals with evaluation of smart distribution systems and energy analytics to meet increasing customer demands and expectations of energy utilization.

**Generation, Storage and Integration**

This research focus deals with developing and demonstrating optimal strategies to manage diverse distributed resources and storage.

**Data Management, Analytics and Security**

This research addresses new technologies and the wide-spread application of small-scale component sensors and data collection equipment have greatly increased the amounts of available data, but the challenge is how to manage, use and act on huge amounts of system data.

**Energy Policy, Markets and Economics**

This research focus deals with the impacts that regulatory policies and requirements place on the planning, design, and operations of the grid.

1. **Proposal Template**

Proposal Templates can be received from the Center Director. All Proposals shall be submitted to the Center Director in the CAPER Proposal Template as explained below:

**Project Title**: brief but descriptive

**Project Summary:** consists of an overview, a statement on the intellectual merit , and a statement on the broader impacts of the proposed activity, not to exceed 250 characters. The summary shall be understandable by industry members and describe the problem or issue and state how the proposed research project will address the concern.

**Research Theme:** identify with a check in which of the four Research Times this proposal best aligns.

**University Team Members:** identify Project Lead and all Team Members by noting name, university, email and phone.

**Industry Advisors:** identify at least one Industry Advisor from the Industry Members that has agreed to serve in this role.

**Project Period:** note the Requested Start Date and Proposed Completion Date for the Project.

**Requested Funding:** complete Tables 1 and 2 for base funding and additional Membership funding requests for each researcher and the year requested.

**Project Description:** beginwith a description of the proposed activity and a statement of the objectives and methods to be employed. Include a statement on the intellectual merit and the potential of the proposed activity to advance knowledge and lead to operational application with consideration of current economics and potential cost benefits. The project description should outline the general plan of work, including the activities to be undertaken, and, where appropriate, provide a clear description of experimental methods and procedures. Proposers should address what they want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful. The project activities may be based on previously established and/or innovative methods and approaches, but in either case must be well justified. Brevity will assist reviewers in dealing effectively with proposals. Visual materials, including charts, graphs, maps, photographs and other pictorial presentations may be included but will count towards the five page limit. Principal Investigators are cautioned that the project description must be self-contained and URLs that provide information related to the proposal should not be used to circumvent page limitations. Also reviewers are under no obligation to view the sites, and such sites could be altered or abolished between the time of submission and the time of review.

**Project Benefits:** list the benefits of the project as they relate to industry. State how the results of this project will benefit industry members through cost reductions, improved operations, improved customer service, etc.

**Applications to Industry:** describe how the results can be applied to industry such as tools, hardware, more efficient operations, policies, rates, etc. Describe any commercialization possibilities of this research.

**Work Plan:** describe the methods and techniques that will be used to achieve the project objectives and provide major milestones and dates.

**Related Work:** should consider work that is being conducted elsewhere and provide a brief summary of this work and discuss how the proposed work differs from past work. The unique contribution of this work should be clearly presented.

**Collaboration Plan:** describe the mechanisms for collaboration among the industry advisors and the research team, including the means, type, and frequency of communication. At minimum each project shall have: a kick-off, semi-annual status updates and completion conference calls.

**References Cited**: reference information can bring value to a project and is strongly recommended. Each reference must include the names of all authors (in the same sequence in which they appear in the publication), the article and journal title, book title, volume number, page numbers, and year of publication. Proposers must be especially careful to follow accepted scholarly practices in providing citations for source materials relied upon when preparing any section of the proposal.

If there are no references cited, insert text in this section of the proposal that states, “Not Applicable.”

**Biographical Information of Research Team:** short biographical information should be provided for the Project Lead and each member of the Research Team. Include university affiliation, research experience and area(s) of expertise. **Do not submit** personal information such as home contact information, home e-mail address, date of birth, citizenship, marital status, and personal hobbies. Such personal information is irrelevant to the merits of the proposal.

**Budget and Budget Justification:** each proposal shall contain a budget for each year of support requested. If the proposed project covers multiple years, a budget for each year of support is required and a total budget for the multiyear project shall be included. Please include amounts for each budget line item listed in Table 3 if applicable. Add additional line items if necessary. It is preferred to breakout the line items by individual researcher. The proposer may request funds under any of the categories listed in Table 3 as long as the item and amount are considered necessary, reasonable, allocable, and allowable under applicable cost principles. Amounts and expenses budgeted also must be consistent with the proposing organization's policies and procedures and cost accounting practices used in accumulating and reporting costs.

**Contact Information:** proposal should include complete contact information in Table 4 including name, mailing address, phone number, and email address for Principal Investigator and Proposal Administrator (e.g. Office of Sponsored Programs contact).