

IEEE IFEC'22

2022 International Future Energy Challenge

College Student Competition

<http://www.energychallenge.org/>

REQUEST FOR PROPOSALS

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General Co-Chair

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■ IFEC Introduction

IFEC is an international student competition for innovation, conservation, and effective use of electrical energy, which is open to college and university student teams from recognized engineering programs in any location.

The competition is sponsored by the Institute of Electrical and Electronics Engineers (IEEE) Power Electronics Society (PELS), Power & Energy Society (PES), Industry Application Society (IAS), Industrial Electronics Society (IES), Vehicular Technology Society (VTS) and Power Sources Manufacturers Association (PSMA).

■ Topic

Smart, Efficient and Light Solar Powered Microgrid Inverter

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University of Tennessee, Knoxville, USA

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Co-Chair:

Prof. Daniel Costinett

University of Tennessee, Knoxville, USA

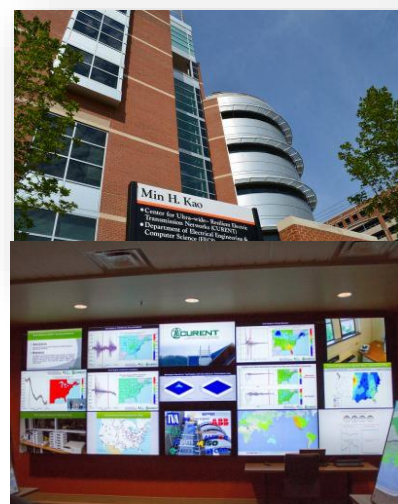
Email: daniel.costinett@utk.edu

Public Chair:

Prof. Helen Cui

University of Tennessee, Knoxville, USA

Email: helencui@utk.edu



■ Participation

Participation is on a proposal basis. Those schools that are interested must submit a proposal to the topic chairs above before the proposal deadline. Each Proposal will be judged by a distinguished panel of volunteer experts from the IEEE and from industry. Schools with successful proposals will be notified and qualified for the rest of the competition. Deadline for each period will be posted on the IFEC website. The outstanding teams will be invited to a competition event in summer of 2021.

In each of the two topic areas there will be a Grand Prize of \$10,000 and three additional awards granted at \$1,000, \$3000 and \$5,000 each.

Important Notice:

- ✧ Each proposal will be judged separately. Each team proposal must address the specs in the following page of this RFP.
- ✧ Each university can support only one team.
- ✧ Teams are limited at minimum 4 members, with at least two undergraduate students. Interdisciplinary teams are encouraged. Graduate students are not excluded, but are limited to the advisory role in the team.

■ Important Deadlines

Proposal Due	Oct. 31, 2021
Notification of Acceptance	Nov. 30, 2021
Workshop at ECCE'2022	Mar. 20, 2022
Notification of Final Teams	Mar. 27, 2022
Final Competition	Jul, 2022

Please visit <http://www.energychallenge.org/> for more detailed information.

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TOPIC INTRODUCTION

Smart, Efficient and Light Solar Powered Microgrid Inverter

Final Competition time: March, 2022

Location: University of Tennessee, Knoxville, USA



CURENT, Min H Kao Building, University of Tennessee, Knoxville, USA

■ Goals

Construct a solar inverter that will

- Allow maximum power point tracking and adjust the active power delivery based on the grid frequency profile;
- Compensate the reactive power compensation based on the grid voltage amplitude;
- Reduce the overall manufacturing cost;
- Minimize the size and weight of the whole inverter;
- Minimize cooling requirements and achieve greater efficiency.

■ Key Specifications

- **Grid voltage:** single-phase and three-phase universal ac input, 50 Hz~60 Hz;
- **Solar input voltage:** 30 V~60 V (48V for nominal);
- **Output power:** 1kW at $V_{in}=50$ V;
- **Reactive power compensation:** see detailed CFP online;
- **Grid current THD:** <2% @ 1kW;
- **Input power factor:** >0.99 @ 1kW;
- **Efficiency:** $\geq 95\%$ @ 1kW & $\geq 94\%$ @ 500W.
- **Cooling:** natural or forced convection;
- **Volume & Weight (power electronics):** no specific requirement, but small number takes the advantage;
- **Protection:** OCP, OVP, SCP, OTP, no damage @SCP;
- **Safety:** galvanic isolation is needed. no exposed live electrical elements.

Please refer to IFEC'22 Request for Proposal (RFP) for more detailed information.

Available at: <http://www.energychallenge.org/>