Request for Proposals: High-Risk/High-Reward Topics

The Energy and Biosciences Institute (EBI) Technical Steering Committee (TSC) & Shell Next Generation Breakthrough Research (NBR) Group

Please circulate to faculty in your department

Introduction
The EBI is inviting discipline agnostic "high-risk/high-reward" proposals that address the need for future energy and chemical carrier breakthroughs to meet climate neutral and sustainability targets set forth by the 2015 Paris Climate Accords. While recent advancements in energy pathways have reduced the carbon intensity of electricity generation (e.g. solar, wind) and utilization (e.g. electric vehicles, biofuels), the world will require additional advancement of sustainable energy and chemical pathways to not exceed $1.5^{\circ}C$ average temperature rise compared to pre-industrial levels.

The EBI is looking to fund short-term projects that offer significant potential for sustainability and decarbonization compared to current technologies, while being economically viable, globally scalable, and socially acceptable. Since the projects will have a maximum duration of 18 months, we specifically seek proposals that test the technical and economic feasibility of a "high-risk/high-reward" idea in sustainable energy and chemistry. We anticipate that the principal investigators (PIs) of successful projects will be invited to submit proposals for a second phase of funding.

At this time, we invite PIs at UC Berkeley, Lawrence Berkeley National Laboratory, and the University of Illinois, Urbana-Champaign to submit proposals that outline steps for testing the feasibility of a "high-risk/high-reward" idea in the areas of interest described below. Only PIs or Co-PIs with primary appointments at these partner institutions are eligible for funding. PIs with Howard Hughes Medical Institution (HHMI) or equivalent appointments are not eligible to participate. With a commitment of $400,000 to this specific call, project funds will be capped at $130,000 for the duration of the project. Because the problems posed are complex, we envision that some of the proposals will involve multiple investigators who will contribute complementary expertise to a team approach to the problem. However, each proposal should have a single PI who can serve as a point person for the interaction between EBI and the team.

Themes of Interest
The following themes are of interest:

- Energy carriers and supporting infrastructure for transportation (road, marine, and aviation) and industry;

- Low-carbon technologies for industrial heating (e.g., chemical/refining, steel, cement) or upgrading low-grade heat;

- Circular (bio)chemical production using waste streams with equivalent or superior functionality compared to existing production;

- Energy storage technologies for transportation, industrial, and grid applications (mechanisms for conversion to/from carriers should be explicitly considered); and

- Carbon removal and long-term storage technologies.

Project Duration

The project duration should not exceed 18 months. Because no-cost extensions will not be granted, the project duration and timeline should factor in delays associated with startup and hiring.

Project Funding

Funding will come from the EBI TSC. Total project funding request, including indirect costs, should not exceed $130K.

Scoring Criteria

All proposals will be evaluated by the EBI TSC in coordination with the Executive Steering Committee (ESC) with consultation from discipline experts based upon the theme(s) covered by the proposal. Proposals will be evaluated against the following scoring criteria:

- Is the proposed work novel?

- Does the proposed solution address a substantial market segment?

- Does the proposal offer a technically sound approach to rapidly determine the feasibility and scalability of the proposed solution?

- Is the theoretical carbon intensity and/or levelized cost of energy of the proposed solution dramatically less than current production methods?

- Does the proposal solution adequately address societal acceptance considerations?

Proposals should be submitted by the deadlines outlined in the table below. The proposals will be evaluated by the EBI-Shell Technical Steering Committee based on scientific quality, programmatic fit, and prior experience & success of the PI in the research area of interest. Funding decisions will be final, and EBI <u>will not</u> provide copies of proposal reviews to proposers.

Proposal Submission	April 26th, 2024
Proposal Review and funding decisions	June 15th, 2024
Earliest Project Funding Begins	August 1st, 2024

Application Instructions

- Applicants must submit their completed proposal electronically as a single PDF file to Shelley Brozenick (sbrozenick@berkeley.edu) by 12 midnight (Pacific Time) on Friday, April 26th using the subject line ***"EBI-Shell HRHR Proposal."*** The pdf file name should be the PI's last name underscore HRHR (*Surname_HRHR.pdf*). Please only use Arial or Times, a minimum font size of 11, and leave a 1-inch margin around the document.

- In addition to the PDF file, please submit the budget as a separate Excel spreadsheet using only the attached budget template. ***No other budget formats will be accepted and do not save spreadsheet as PDF.*** For logistical questions please contact sbrozenick@berkeley.edu. The proposals should be broken down into the following four sections.

1. Executive Summary (1 page):
   Provide a synopsis of the proposed project and, if applicable (LBNL only), confirm submission to the eSRA.

2. Introduction/Background (2 pages max)

3. Technical Plan (5 pages max):
   Outline and address technical challenges inherent in the approach and possible solutions for overcoming potential problems.

4. Appendices
   a. Budget (use only Excel template attached)
   b. Budget Justification
   c. Images (unlimited)
   d. References (unlimited)
   e. 3-page NSF style Bio sketches required for all PIs

- Any images provided will not count against the page limit. All proposals are due on Friday, April 26th, 2024 before 12 midnight Pacific Time. Late or incomplete submissions will not be considered eligible for further consideration.

- **IMPORTANT – LBNL APPLICANTS ONLY**: In order to avoid significant delay in project initiation, Principal Investigators need to submit their proposal to the eSRA system in parallel, as this will prompt the DOE foreign review process once all relevant information has been provided. This should be clearly documented in the executive summary!

- **IMPORTANT – Only the final, selected proposals will need to be submitted in Phoebe, UC Berkeley's online proposal routing and approval systems.**

- In addition, a three-page "NSF-style" curriculum vita of all principal investigators is required, as well as a brief description of available facilities. *Any images can be provided as appendices and will not count against the proposal page limit.*

- Proposals are due by **12 midnight Pacific Time on Friday, April 26h, 2024**. Responding PIs should work with their institutional Research Administrators to develop an appropriate budget using the EBI-Shell Budget template (**Applications not using this template will be eliminated from further consideration**.)

- PIs will be notified of funding decisions by Friday, June 28th 2024. The earliest start date for funded proposals will be August 1, 2024.

- Each funded project will be assigned a Shell program lead with whom the project PIs will be expected to coordinate regular (at minimum monthly) project discussions.

Intellectual Property Obligations and Public Disclosures
- PIs receiving funding through the EBI are required to sign a Research Project Implementing Letter (RPIL) prior to project initiation which sets the scope of the research being funded,

and therefore, determines which publications and disclosures need intellectual property review.

- EBI researchers must submit all publications, posters, and public presentations related to the Project Deliverables described in the RPIL to their assigned program lead and to the EBI (ebiadmin@berkeley.edu) for review 30 days prior to any proposed public disclosure. In addition, the program must be acknowledged e.g. *the authors gratefully acknowledge the Energy & Biosciences Institute-Shell research program for funding this work.*

- All EBI PIs, students, postdocs, and professional research staff are required to sign an Informed Participation Agreement (IPA) confirming that they have read and understood the terms of the Sponsored Research Agreement governing their project(s). A copy of the signed IPA must be submitted to EBI Program Manager, Shelley Brozenick: sbrozenick@berkeley.edu prior to the initiation of funding.

Financial Reporting

- EBI principal investigators are obligated to report annual expenditures to the EBI Directorate through the EBI program manager prior to the Fall Reviews and the Final Project Report.

- The EBI Directorate retains the authority under the Research Agreement to re-allocate any unspent research funds provided to other EBI programs, projects (science and non-science), and initiatives at the conclusion of the currently funded project term.

Research Progress Reporting

- PIs are required to report on work performed according to the following schedule specified in the RPIL:

  o Regular teleconferences between PI and Shell program lead(s)

  o Annual Key Personnel and Materials update

    ▪ A form will be sent to PIs as part of the fall review process requiring completion by the deadline provided.

  o Participation in the EBI Fall review and Spring Site Visit and the Bi-annual Workshop or Retreat. Nonattendance of PI's at the EBI Retreat will jeopardize continuation of project funding.

    ▪ EBI Spring Site Visit – informal meeting between ESSC, PI and students/postdocs at the location where the research takes place (site visits)

    ▪ EBI Fall Review – formal reviews of project progress and budget overview between ESSC and PI/Co-PI

    ▪ Biannual Workshop or Retreat – technical discussions between PIs and their teams, SSLs, Shell Program Leads, and ESSC. Other EBI events may occur such as topical workshops, meetings, seminars, and presentations where your attendance is essential, and every effort should be made to attend/participate.

  o Final written research report is due 3 months after completion or termination of the research project

- Project funding is contingent on meeting key project objectives and timelines as outlined in the RPIL and as reviewed and approved by the Shell Program Leads.

Contact

For further technical questions, please contact the following individuals:

EBI: Christopher V Rao cvrao@illinois.edu +1 (217) 244-2247

Shell: David Kordonowy David.Kordonowy@shell.com +1 (281) 544-9266

For administrative or general support questions, please contact: Shelley Brozenick sbrozenick@berkeley.edu.