# PROGRAM DESCRIPTION

The 2022-2023 Energy Seed Grant Program is a funding opportunity sponsored by The Energy Institute at The University of Texas at Austin to spark new, impactful and collaborative research in any field of energy with an aim towards decarbonization and climate security.

# sYNOPSIS OF PROGRAM

Global energy demand continues to rise, while greenhouse gas emissions must fall in order to mitigate the impacts of climate change. Addressing this, while ensuring equitable access to energy is one of the greatest challenges facing society. Many governments and companies have set ambitious goals to achieve net zero carbon emissions by 2050; however, the technologies and policies needed to achieve these goals do not fully exist. The 2022-2023 Energy Seed Grant Program aims to accelerate the scientific, engineering, technological, techn-economic and policy innovations needed to achieve these climate goals. This opportunity is open to all fields of energy research, but these four topical areas are of particular relevance:

*Carbon Management or CCUS (utilization via all pathways including biological).* A future with net zero carbon emissions will require technology and policy advances in carbon capture—including point source and direct air capture (DAC)—carbon storage, and carbon utilization—i.e., the conversion of CO2 to useful products. These approaches might include the development of new catalysts, tools of synthetic biology and nature-based solutions, among others. The generation of clean hydrogen from natural gas requires effective carbon capture, storage and utilization strategies. Research addressing technoeconomic hurdles and opportunities, and government policy frameworks that could promote/hinder development or build-out are of particular interest.

*Low and Zero-Carbon Fuels and Distributed Energy Resources (DERs)*. Renewable energy sources, such as wind, solar, biofuels and geothermal will provide critical resources for generating low-carbon electricity and low- to no-carbon fuels. Long-duration, daily-to-monthly, energy storage technologies will be required to manage the intermittency of solar and wind. Clean hydrogen can be generated and used or converted to NH3, methanol or formate for example, for transport and later use in a wide range of chemicals, biofuels and biological and materials processes. Plastics production and use must be made more sustainable. The widespread emergence of electric vehicles (i.e., e-mobility) and the potential for bidirectional charging—so-called vehicle-to-home (V2H), vehicle-to-grid (V2G) or vehicle-to-anything (V2X)—are providing new opportunities for reducing carbon emissions and improving our energy resiliency. In addition to the numerous technology hurdles, the appropriate mix of these many options will vary by region and country and be determined by policy-enabled markets (for early adoption), which need to be understood. Seed ideas for hard-to-abate challenges (such as long-distance transportation, including shipping and aviation among others) are especially encouraged.

*Industrial [Chemical/thermal (heat)] Decarbonization.* Industrial processes account for about 25% of all global greenhouse gas emissions, and these carbon emissions are rising much more rapidly than carbon emissions in the power, transportation and buildings sectors. About 45% of industrial GHG emissions arise from manufacturing steel, cement, ammonia and ethylene, which come from the feedstocks and raw materials (45%), high-temperature heat generation (35%) and additional fuels burned to generate low- and medium-heat (20%). Electrification of industrial processes provides a route to decarbonization, but faces significant technological challenges. Carbon emissions are inherent to the chemical processes currently used to make these materials, because not only are there significant carbon emissions associated with the energy produced to drive the manufacturing, but CO2 is also emitted as a byproduct of the reactions used to make these materials and chemical products. Alternative materials, chemistry, feedstocks and process paths are needed. As an example of the magnitude of this challenge, to meet the clean hydrogen standard set forth in the infrastructure bill, the amount of CO2 produced per kg of H2 needs to decrease from nearly 10 kg of CO2/kg of H2 to less than 2 kg of CO2/kg of H2. There are opportunities to minimize and eliminate wastes using advanced manufacturing strategies, such as additive manufacturing (3D printing), circular economy (for plastics, water, critical materials, etc.) and waste-to-X opportunities, where X can be H2, power, etc.

*Power Value Chain Decarbonization*. This sector has one of the highest potentials for lowering carbon footprint, especially through higher integration of renewables in the grid. Opportunities exist with grid expansion/efficiency, CCUS enablement in existing infrastructure, and distributed energy resources integration without/with energy storage and hybrids including SMART grid/home/vehicle inter-connects for more-than-one-way power transmission/distribution.

# ELIGIBILITY

Open to all Colleges or Schools at UT Austin.

*Proposals must be submitted by collaborative teams of 2-3 investigators.*

One individual must be selected as the project PI.

An individual may participate as PI on no more than one proposal. An individual may participate as co-PI on up to four proposals.

**Estimated Number of Awards:** 17

**Maximum Total Funding Per Project:** $60,000

**Award Duration:** 1 year

**Letters of Support Required:** Each proposal is required to have at least one letter of support from an external partner—a company, a governmental entity, or a foundation or philanthropic organization. The letter(s) should indicate the importance of the work and indicate that there is high probability for follow-on funding after the close of the seed project research period.

**Matching Funds (Optional):** Though not required, proposals can include matching funds. Proposals with matching fund contributions will be viewed favorably.

# PROPOSAL SUBMITTAL

PIs must submit one combined proposal through the online competition portal (<https://utexas.infoready4.com>).

# PROGRAM TIMELINE

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| May 2, 2022 | Request for Proposals (RFP) Released |
| July 1, 2022 | Proposals Due (5:00 PM Central Standard Time) |
| August 1, 2022 | Awards Announced |
| September 1, 2022 | Performance Period Begins (Funds Available) |
| August 31, 2023 | Performance Period Ends |
| October 1, 2023 | Final Report Due |

# PROPOSAL ELEMENTS

Application components required at the time of submission are listed below. Please create and submit a single PDF in the following order.

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| **Required Proposal Elements\*** | |
| 1. Proposal Cover Page/Abstract | Use Attachments A and B |
| 2. Project Description | 5 pages maximum, including graphics |
| 3. References | 2 pages maximum |
| 4. Biographical Sketches | 2 pages maximum for each PI/Co-PI |
| 6. Budget Summary | Use Attachment C |
| 7. Budget Justification | 1 page |
| 8. PI and co-PI current and pending support |  |
| 9. Letter(s) of support and/or commitment of matching funds | Signed, on letterhead |

\*Formatting requirements: single-spaced, no less than 12pt Times New Roman font, 1” margins on all sides.

1. PROPOSAL COVER PAGE & ABSTRACT (limited to 400 words, Attachments A&B)

Cover page must include a clear abstract (executive summary) summarizing the essential content of the proposal – including objectives, benefits, and significance of proposed research effort.

1. PROJECT DESCRIPTION

The Project Description should provide a clear statement of the work to be undertaken and must include the objectives for the period of the proposed work and expected significance and the relationship of this work to the present state of knowledge in the field, as well as to work in progress by the PI under other support. The Project Description should outline the general plan of work, including the broad design of 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. These issues apply to both the technical aspects of the proposal and the way in which the project may make broader contributions.

1. REFERENCES

List any references referred to in the Project Description.

1. BIOGRAPHICAL SKETCHES

Biographical sketch attachments must be included for the PIs and Co-PIs using [NSF-style formatting](https://www.nsf.gov/bfa/dias/policy/biosketch.jsp).

1. BUDGET SUMMARY (Attachment C)
2. BUDGET JUSTIFICATION

Details for proposed expenditures must be described in one budget justification section.

1. PI AND CO-PI CURRENT AND PENDING SUPPORT

Current and pending support information must be provided for ongoing projects. This includes, for example, Federal, State, local, foreign, public, or private foundations, non-profit organizations, industrial or other commercial organizations, or internal funds allocated toward specific projects.

1. LETTER(S) OF SUPPORT AND/OR LETTER(S) OF COMMITMENT FOR MATCHING FUNDS

All proposals are required to have at least one letter of support from an external partner from industry, governmental organizations, foundations or philanthropic organizations that indicate strong interest in providing follow-up funding for the proposed project at the end of the seed project period. Matching funds may also be provided by external partners and will be viewed favorably.

# PROPOSAL eVALUATION

All proposals will be reviewed by an ad hoc review committee. The PIs are expected to include all required proposal components and fully and clearly address each criterion. The following criteria will be the basis for evaluating applications.

1. **Potential and Significance.** Does the project address an important problem or a critical barrier to progress in the field? If the objectives of the project are achieved, how will engineering or scientific knowledge, technical capability, and/or standard practice be improved?
2. **Investigators.** Do the PIs have appropriate experience and training; have they demonstrated an ongoing record of accomplishments that have advanced their field(s); do they have complementary and integrated expertise?
3. **Innovation.** Does the application challenge and seek to shift current research or practice paradigms by utilizing novel theoretical concepts, approaches or methodologies, and instrumentation?
4. **Approach.** Are the overall strategy, methodology, and analyses well-reasoned and appropriate to accomplish the project objectives?
5. **Collaboration Environment.** Will the project environment in which the work will be done contribute to the probability of success? Will the project benefit from new and unique features of the collaborative arrangements and technical environment?

# GRANT ADMINISTRATION

Each PI (applicant) is responsible for the administration of grant funds within UT Austin’s rules and regulations. In particular, each PI must be certain that over-expenditures do not occur and that all funds are fully expended according to institutional programmatic deadlines. All work must be completed within the performance period. Requested for extensions on the end date of the award will require approval at least two months before the end of the project period.

# Mid-Project & FINAL REPORTING REQUIREMENTS

Each team will be required to participate in a virtual Mid-Project Review Meeting. Each PI (applicant) is responsible for submitting a Final Grant Report per the program timeline. Awardees will be provided final reporting instructions prior to the end of their project.

# CONTACT INFORMATION

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| Christa Hopkins |
| Senior Administrative Associate  The Energy Institute  The University of Texas at Austin |
| Phone: (512) 475-8447 |
| Email: christa@energy.utexas.edu |

## Proposal Submission Instructions

## PI Eligibility & Application Limits

* PIs and Co-PIs must be full-time, tenure-track, tenured faculty, or non-tenure-track faculty with active Principal Investigator status with a primary appointment in a UT Austin School or College. PIs and Co-PIs must be in residence at the time of application.
* A faculty member may be designated as PI (primary applicant) on only one proposal. An individual may serve in a Co-PI or other collaborative role on no more than four other applications.
* Energy Institute appointed faculty and staff are not eligible to serve as PI or co-PI on any applications.
* It is the PI’s responsibility to ensure that all team members are eligible and not exceeding application limitations.

## Budget Considerations

Funds **can** be used for the following:

* Salaries for faculty, postdoctoral fellows, graduate and undergraduate students.
* Tuition for graduate students.
* Materials and supplies
* Expenses for field work, data collection, archival research, training, educational purposes and/or presentations on research, creative or scholarly activities directly related to the proposed project
* Travel (data collection, conference presentation, meeting with a collaborator). Travel must adhere to UT Austin policies and procedures, including rules for travel paid with state funds.

Funds **cannot** be used for the following:

* Non-UT Austin employee travel
* Indirect costs (F&A) costs
* Consultant fees
* General-use equipment not specific for the project
* Payment of salaries to non-UT Austin personnel
* Refreshments. Includes food/refreshments for participants, business meals. Excludes meals while on travel.

Project Information

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| **Project Name:** |  | | |
| **Name of UT Austin Principal Investigator (PI):** |  | | |
| Phone Number: |  | | |
| Email Address: |  | | |
| PI College, Department |  | | |
|  | | | |
| **Name of UT Austin**  **Co-Principal Investigator (Co-PI), *if applicable*:** | |  | |
| Phone Number: | |  | |
| Email Address: | |  | |
| College/Division and Department: | |  | |
| **Name of UT Austin**  **Co-Principal Investigator (Co-PI), *if applicable*:** | |  | |
| Phone Number: | |  | |
| Email Address: | |  | |
| College/Division and Department: | |  | |
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| **Does this project require human subjects, vertebrate animals, and/or biohazardous materials?** | | | * **Yes** * **No** |

Abstract (400 words or less)

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A budget justification (not to exceed one page) must also be submitted describing each of the proposed line item expenditures for both institutions.

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| UT Austin Budget | |
| 1. Salaries and Wages | $ |
| 1. Equipment: | $ |
| 1. Travel: | $ |
| 1. Graduate Student Tuition: | $ |
| 1. Material and Supplies: | $ |
| 1. Other Direct Cost: | $ |
| Total UT Austin Request: | $ |