HPC4EnergyInnovation Full Proposal Template

***Upload submission at*** [*https://proposalshpc4.inl.gov/*](https://proposalshpc4.inl.gov/)

|  |  |
| --- | --- |
|  | **Use this proposal template as an outline to develop your full proposal. Delete all shaded instructional boxes before submitting full proposal. To delete shaded boxes, select table and then press delete.** **Formatting: Seven (7) single-spaced pages using 12-point Times New Roman font, 1” margins, and formatted in a PDF file. Follow-on project proposals should not exceed nine (9) single-spaced pages using 12-point Times New Roman font, 1” margins, in PDF file format, and should include all the components with additional Results from Prior Funded Project section.** |

Proposal Tracking Number:

Project Title:

Company Name:

National Laboratory PI Contact Information:

 Name:
 Laboratory:

Bottom of Form

**These sections are limited to seven (7) single spaced pages using 12-point Times New Roman font, and 1” margins. A full proposal that does not meet guidelines will be rejected for review. Delete all shaded instructional boxes before uploading full proposal.**

## Abstract

|  |  |
| --- | --- |
|  | **(150 words or less)**Provide a non-proprietary, publishable summary of problem being addressed, why problem is important to the energy future of the United States, plan to address problem, and the impact the solution. If selected for the HPC4EI Program, this abstract will appear on award announcements sent to the press and posted on the program website. |

## Background

|  |  |
| --- | --- |
|  | Describe the technical challenge to be addressed; the state of the art in this area and how this work advances the state of the art; how solving this problem will meet the goals of the HPC4EI Program as defined by the list of topics of interest; the relevant expertise of the industry partners; what national laboratory expertise is needed; and why national laboratory HPC resources are required and how they will be used. Indicate if the proposed project will accelerate transformational technological advances in areas that industry by itself is not likely to undertake because of technical and financial uncertainty. |

## Follow-on project proposals only: Results from the prior funded project (two additional pages maximum with figures)

|  |  |
| --- | --- |
|  | Review the results and knowledge gained from the Demonstration project. Explain how these results will be used to address the objectives of this proposal. If you believe that the current proposal is distinctly different from the previous project and should not be considered as a follow-on project, please articulate the differences. |

## Project plan and Objectives

|  |  |
| --- | --- |
|  | Describe the technical scope of work to be performed and how this scope will fit into the broader solution for the challenges being addressed, including, for example, relevant experimental work. Outline a set of tasks to be performed by each participant. Include description of work activities performed by the industry partner, national laboratory partner, and/or university or non-profit. Describe how the results of the project will be validated, including availability of data. If possible, identify simulation codes to be used in this effort and any modifications to the software that are needed to solve the proposed problem. Summarize how your project plan will address the key proposal review criteria listed below.  |

***Advances the current state of the art in the industrial sector:***

***Technical feasibility:***

***Relevance to high performance computing:***

## Tasks, Milestones, Deliverables, Schedules

|  |  |
| --- | --- |
|  | Include goals, timelines, and due dates throughout the life of the project. Not every milestone needs to have a deliverable. Include deliverables from all partners, not just the national lab partner(s). Indicate responsible party(ies) for each deliverable. Include deliverables from one partner to another, as well as those to the DOE program sponsors. |

**Task 1:**

Activities:

Information flow: (who gives what information to whom)

Deliverables:

**Task 2:**

Activities:

Information flow: (who gives what information to whom)

Deliverables:

**Task 3:**

Activities:

Information flow: (who gives what information to whom)

Deliverables:

Continue format.

## **Validation and Verification Plan**

|  |  |
| --- | --- |
|  | Summarize how the model will be validated and the simulations verified. Include information about the data that will be used for verification, its nature and source. |

## Impact

|  |  |
| --- | --- |
|  | Estimate how this specific HPC effort will result in national-scale, long-term energy and carbon savings across the industry; the performance improvements that are expected over existing technologies; and the ability of industry to accelerate the adoption of energy-efficient technologies. Explain how this specific HPC work contributes to a transformational change in the energy sector and enduring economic impact. Describe the alternative actions if this effort is not funded including reliance on experimental technologies or other courses of action. Include metrics for energy/carbon improvements, performance increases, cost savings, and/or time reductions. Describe additional impacts this work will have on manufacturing and HPC communities. Include plans for any publications, improvements to open-source software, public databases that will be released or improved, and training provided for students or postdocs, etc. |

## Energy Savings Estimates

|  |  |
| --- | --- |
|  | Energy Savings Estimates – Provide numerical estimates for annual energy and carbon savings. Energy/carbon savings should be on an annual basis, assuming successful implementation of the technology being enabled by the HPC effort. Estimates for market penetration used for the savings should be realistic and conservative. |

Annual Energy Savings Company-wide: TBTU or GJ or Gallons Fuel Savings

Annual Nationwide Savings: TBTU or GJ or Fuel Savings

Justification for Estimated Energy Savings:

Product Lifecycle Annual Energy Savings: TBTU or GI or Gallons Fuel Savings

Justification for Estimated Energy Savings:

Company-wide CO2 Reduction: \_\_\_\_\_\_ tonnes /year

Nationwide CO2 Reduction: \_\_\_\_\_\_ tonnes /year

Justification for Estimated Carbon Reduction:

## Implementation and Adoption

|  |  |
| --- | --- |
|  | Describe how this work will be incorporated into company and industry-wide operations. Describe the follow-on activities to extend this effort to solve the broader problem being addressed. If a new or modified material is developed, can the team provide a preliminary techno-economic analysis by the close of the project? |

## Other Impacts

|  |  |
| --- | --- |
|  | Describe other impacts this work will have on manufacturing and HPC communities. Describe plans for any publications, improvements to open-source software, public databases that will be released or improved, and training provided for students or postdocs, etc.  |

## Appendix A: References (not included in page count)

## Appendix B: Project Summary of Tasks and Schedule (not included in page count)

|  |  |
| --- | --- |
|  | Provide a summary of the tasks and subtasks in a table format that includes the milestones, deliverables, and schedule. Include a schedule summary in Gantt chart format. |

*Task Summary Table*

|  |  |  |  |
| --- | --- | --- | --- |
| TASKS | MILESTONES | DELIVERABLES | SCHEDULE |
| *Task/Subtask #* | *Goals of the Task* | *Deliverable (e.g. information, results, samples, reports, publications, presentations), and who is responsible for delivery. What information is required from other partners to achieve deliverables.* | *Timeline and Due Dates throughout Life of the Project (e.g. 3 months after approval of funding or 1 month after completion of #2 Milestone, etc.) Avoid hard dates if possible.* |
|  |  |  |  |
|  |  |  |  |



## Appendix C: Project Budget (not included in page count)

|  |  |
| --- | --- |
|  | Summarize project costs including amount and source of participant contribution in the table provided. Indicate in- kind and/or cash contribution for industry funding. Include a description of how this funding will make a large difference relative to existing funding from other sources, including the private sector and why the government should fund this work. Funding for university and/or non-profit participants may be provided by the National Laboratory or the industrial partner. If the funding for a university or non-profit participant is to be provided by DOE through the DOE laboratory partner, funding requests must be less than half of the total DOE funds. Funding provided to a university and/or non-profit by the industrial partner can be considered a component of the industrial partner’s in-kind funding contribution. **Industry partner cash contributions are made to either the laboratory or a university or non-profit. Refer to Page 8 of Summer 2023 Solicitation document.**  |

*High-level budget by expenditure type and organization. Please indicate if the amount is ‘in-kind’.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Cost Category** | **DOE Funds** | **Industry Partner Cash Contribution**  | **Industry Partner In-kind** | **Total Project Funding** |
| **National Lab Labor**  |  |  |  |
| **National Lab Travel** |  |  |  |
| **National Lab HPC (include platform and #core hours)** |  |  |  |
| **National Lab Procurements (include licenses)** |  |  |  |
| **University and/or Non-profit Funding**  |  |  |  |
| **Industry Partner Labor**  |  |  |  |
| **Industry Partner Travel**  |  |  |  |
| **Industry Partner Procurements (include licenses or subcontracts)** |  |  |  |
| **Totals** |  |  |  |  |

## Appendix D: Computational Resources (not included in page count)

|  |  |
| --- | --- |
|  | In paragraph form, describe the computational approach, the performance of the codes, and the resources requested (platform and number of core hours). Platforms are listed on the [HPC4EI Computing Resource web page](https://hpc4energyinnovation.llnl.gov/computing_resources.html), please indicate a preference and why that system is preferred. Provide information about whether the code can run efficiently on a GPU platform or requires a CPU platform. Also describe how the results are to be disseminated to the end users. If you plan to use a GPU based machine, please indicate the machine name and provide your compute time in node hours, otherwise please provide your compute time in core hours. **For requests over 10 Million core-hours on a CPU resource or equivalent on a GPU resource please describe how you plan to gain access to this level of resource.** |

|  |  |  |
| --- | --- | --- |
| **System platform** | **Million core-hours (CPU)** | **Million node-hours (GPU)** |
|  |  |  |
|  |  |  |
|  |  |  |

## Appendix E: Pictures for Publication (not included in page count)

|  |  |
| --- | --- |
|  | Include one or two non-proprietary picture/images with a short caption that can be used in a press release and posted on the website should this project be funded. If selected for funding, be prepared to provide image (s) ready for public release in high resolution file (s) to the HPC4EI Program Administrator.  |

## Appendix F: Discussion of How This Work Benefits the Laboratory (not included in page count)

|  |  |
| --- | --- |
|  | Briefly discuss new or enhanced capabilities that will be gained by the partneringlaboratory. Or, explain how this will help to maintain existing laboratory capabilities. |

## Appendix G: Principal Investigator’s Biography (not included in page count)

|  |  |
| --- | --- |
|  | Include one paragraph non-proprietary biography for both the industrial PI(s) and partnering laboratory PI(s). These may be posted on the website should this project be funded. |

## Appendix H: Resumes (not included in page limit)

|  |  |
| --- | --- |
|  | Include resumes of project team to industry partner PI(s), national laboratory PI(s), and/or university or non-profit organization. |