**LOW-CARBON ENERGY RESEARCH (LCER) PHASE 2 PROGRAMME HYDROGEN AND EMERGING TECHNOLOGIES FUNDING INITIATIVE (HETFI) –**

**EMERGING TECHNOLOGY GRANT CALL**

**FULL PROPOSAL**

**All information is treated in confidence. The information is furnished to A\*STAR with the understanding that it shall be used or disclosed for evaluation, reference, and reporting purposes.**

**Proposal ID: *(generated by iGrants)***

**Proposal Title: *(Bold, Font 12)***

**Submission Date:**

**Duration of Project *(up to 3 years)*:**

**Budget Requested *(Excluding Indirect Costs)*: S$**

**Host Institution:**

**Application Type: *Please indicate if this submission is a new application or if it is a renewal which builds upon a previous collaboration.***

**OVERVIEW OF SECTIONS**

**Instructions for Formatting:**

* Use Calibri, font size 12, Single spacing in this application form.
* Do not exceed 7 pages for Sections 3 to 8.
* Sections 9 - 13 may be excluded from the page count, while Section 10 may be included as Appendix B.
* When submitting your proposals, please delete the guiding questions accordingly and add your own sub-sections for your work packages.

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| **SECTION** | **DESCRIPTION** |
| 1 | **DETAILS OF TEAM MEMBERS (LEAD PI(S), CO-I(S) AND COLLABORATOR(S))** |
| 2 | **ABSTRACT** |
| 3 | **RESEARCH OBJECTIVES AND APPROACH** |
| 4 | **SIGNIFICANCE OF PROJECT** |
| 5 | **IMPLEMENTATION** |
| 6 | **MILESTONES AND DELIVERABLES** |
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| 13 | **DECLARATION FROM DIRECTOR OF RESEARCH OR EQUIVALENT OF HOST INSTITUTION(S)** |

**SECTION (1)** - **DETAILS OF TEAM MEMBERS (LEAD PI(S), TEAM PI(S), CO-I(S) AND COLLABORATOR(S))**

*Insert details of each team member in the tables below. If required, please insert additional tables.*

The Lead PI’s role will be to coordinate research activities carried by research team. He/She will be responsible for all progress reporting of the programme, on behalf of the research team.

The Co-I(s) will be the person(s) leading and managing a particular aspect of the collaborative effort.

Collaborator(s) refers to any company, institution, incorporated body or other industry or academic collaborator, who are engaged in the research in collaboration with the Programme Lead or Co-Is.

**Lead PI** (mandatory)

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| --- | --- |
| ***Host/Lead Institution*** |  |
| *Name* |  |
| *Title/Department* |  |
| *Email Address/Contact Number* |  |
| *Research Liaison Name* |  |
| *Research Liaison Email Address/Contact Number* |  |

**Co-I(s)** (if any)

**Co-I (1)**

|  |  |
| --- | --- |
| ***Host/Lead Institution*** |  |
| *Name* |  |
| *Title/Department* |  |
| *Email Address/Contact Number* |  |
| *Research Liaison Name* |  |
| *Research Liaison Email Address/Contact Number* |  |

**Co-I (2)**

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| --- | --- |
| ***Host/Lead Institution*** |  |
| *Name* |  |
| *Title/Department* |  |
| *Email Address/Contact Number* |  |
| *Research Liaison Name* |  |
| *Research Liaison Email Address/Contact Number* |  |

**Academia Collaborator(s)** (If any)

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| ***Host/Lead Institution*** |  |
| *Name* |  |
| *Title/Department* |  |
| *Email Address/Contact Number* |  |
| *Research Liaison Name* |  |
| *Research Liaison Email Address/Contact Number* |  |

**Industry Collaborator(s)** (If any)

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| ***Industry Partner*** |  |
| *Unique Entity Number (UEN)*  *UEN is a 9 or 10 digit identification number that is issued by the government in Singapore to all entities that operate within the country.* |  |
| *Company Enterprise Type[[1]](#footnote-1)* |  |
| *Company Annual Revenue and no. of staff at the point of identification* |  |
| *Scientist Name* |  |
| *Scientist Email Address/Contact Number* |  |
| *Business Liaison Name* |  |
| *Business Liaison Email Address/Contact Number* |  |

**SECTION (2) - ABSTRACT**

**Abstract:** *Summarise your project in* ***no more than 300 words****. List specific research objectives, hypotheses, methodology, potential applications/exploitations, novelty/innovative factors, budget needs and funding period.*

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**SECTION (3) -** **RESEARCH OBJECTIVES AND APPROACH**

**Research Objectives:** *What do you intend to achieve? Clearly state the problem to be addressed with neither jargon nor acronyms and explain why it is significant.*

**Assessment of Current Technologies:** *How is it done today, who are the leading researchers (domestic/international) studying the problem, and what are the limitations of their current approaches?*

**Approach:** *Explain your proposed R&D approach (for each work package) and how does it differ from what others are working on? Why do you think your proposal will be successful?*

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**SECTION (4) - SIGNIFICANCE OF PROJECT**

**Relevance to LCER FI:** *(1)**How does your proposed technological solution contribute to Singapore’s CO2 abatement? (2) Why is this technology recommended for Singapore? Give some explanation on the supply and demand considerations and substantiate to demonstrate how it can be economically viable. If appropriate, mention what are proposed price targets for each of the end-products by end of the project, (3) Who are the partners (e.g. industry, foreign IHLs) for the project and what is their significance? (4) Provide a plan for scale-up/commercialisation and budget/resourcing, thinking beyond the project timeline of 3 years.*

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**SECTION (5) - IMPLEMENTATION**

**Project Plan:** *How are financial and human resources organised to accomplish the objective? What are the technical risks and how would these be mitigated? Outline the schedule for all phases of the proposed programme – a Gantt chart can be attached as an appendix.*

**Role of team members**: *What are the roles and contributions of the co-PIs and collaborators? Why are you and your team members particularly qualified to do this? Briefly describe the plans for interaction among the team member(s) and with collaborators in achieving the research objectives. Principles of IP framework which includes disclosure agreement shall be described in appendix.*

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**SECTION (6) - MILESTONES AND DELIVERABLES**

**Projected Outcomes & Deliverables:** *What are the scientific milestones/metrics and deliverables that can be used to measure success at mid-term review and at completion of the program? If successful, how would this generate value for Singapore?*

**Key Performance Indicators:**

Please have a separate KPI table for each work package.

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| **KPI** | | | **Total Capability Indicators** |
| Publications in international scientific journals | Publications | IF< X1 |  |
| High Impact Publications | IF≥ X |  |
| No. of Oral Presentations at Conferences | | Local Conferences |  |
| International Conferences |  |
| No. of Joint Programs/Projects with local/international universities/organisations | | Local universities/organisations |  |
| International universities/organisations |  |
| No. of Ph.D. Students trained and/or graduated with a specialisation related to low-carbon energy research (CCUS/Hydrogen). | | |  |
| Internationally Filed Patents | | No. of Technology Disclosures |  |
| No. of Primary Patent Application filed but not granted. |  |
| No. of Patents granted |  |
| No. of prototypes | | |  |
| No. of technologies deployed, including licenses | | |  |

1Please note that X may be defined differently depending on each Work Package’s area of research. Of note, X is defined as Impact Factor X1, X2, X3 and X4 for Work Package 1, 2, 3 and 4 respectively. (This is an example; you may modify the values and number of work packages.)

**Milestones:** *Please include a separate table for the milestones for each work package. \*Please use shading for the time points.*

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| **Research**  **Milestones/**  **Deliverables** | **Year 1** | | | | **Year 2** | | | | **Year 3** | | | |
| **Q1** | **Q2** | **Q3** | **Q4** | **Q1** | **Q2** | **Q3** | **Q4** | **Q1** | **Q2** | **Q3** | **Q4** |
| **Milestone 1** |  |  |  |  |  |  |  |  |  |  |  |  |
| **Milestone 2** |  |  |  |  |  |  |  |  |  |  |  |  |
| **Etc.** |  |  |  |  |  |  |  |  |  |  |  |  |

**SECTION (7) - BUDGET SUMMARY**

**Proposed Budget:** *Please provide an estimated budget summary with a breakdown of (1) budget request; (2) contributions from performer in kinds; (3) contribution from companies in cash and in kinds. Also, please* ***refer to the budget template, and complete “Annex D – Proposed Budget”,*** *providing additional details for each budget category.*

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| **Vote** | **Budget Request (S$)** | **Performer In-Kind Contributions (S$)** | **Company Contributions: Cash (S$)** | **Company Contributions: In-Kinds (S$)** |
| **EOM** |  |  |  |  |
| **EQPT** |  |  |  |  |
| **OOE** |  |  |  |  |
| **TRVL** |  |  |  |  |
| **IDC** |  |  |  |  |
| **Total** |  |  |  |  |

**SECTION (8) - OTHER FUNDING SUPPORT**

**Support from any industry partner(s), if applicable:** *Provide details on the funding or other resources provided by any participating industry partner(s), where applicable, for this project.*

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| **Items Supported** | **Funding Source** | **Amount of Fund ($)** | **Support Period (Year)** |
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**Other Grant Support:** *List all currently held or applied grants by the team member(s) that are related to this project. These include those supported by / applied to A\*STAR, NRF, Universities and other public funding agencies. Please fill the table below and Appendix D – Other Grant Support (Detailed).*

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| **Title of Research and Lead PI/Co-I’s role in the Project** | **Funding Agency** | **Grant ID (as stated in LOA)** | **Amount of Fund** | | **Grant Period (Start – End dates** |
| **Approved/ Received ($)** | **Balance Available ($)** |
| *i.e. Ammonia Cracking, Lead PI* | *NRF* | *LCERFI-0002* | *$10M / $2.7M* | *$7.3M* | *01 Apr 2022 – 31 Mar 2025* |
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**SECTION (9) – INDEPENDENT PEER REVIEWERS RECOMMENDATIONS**

*Please recommend 3 – 5 independent peer reviewers relevant to your proposed topic. These people should be fairly prominent in the field and are not based in Singapore:*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **SN** | **Name** | **Designation** | **Institution** | **Email Address** |
| i.e. | John Doe | Professor | Imperial College London | J.Doe@imperial.ac.uk |
| 1 |  |  |  |  |
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**SECTION (10) - CURRICULUM VITAE**

*In no more than 2 pages for each person (Lead PI(s)/Team PIs/Co-I(s)/Collaborators) listed in Section 1, please provide the following information wherever applicable (Indicate NA if required information is not applicable):*

* Name and affiliation
* Contact details (office mailing address, email address, contact number)
* Current position (please provide full details, e.g. primary appointment, joint appointments; other academic appointments including those outside of Singapore).
* Percentage of time spent in Singapore every year for the current position (if applicable)
* Employment history
* Academic qualifications (indicate institution’s name and year degree awarded)
* Research interests
* Other key research achievements (e.g. relevant publications, patents, licenses, awards, spin-off companies, external consultancy etc.), if any

**Please attach this section as a separate file labelled as Appendix B – Consolidation of Curriculum Vitae (CV).**

**SECTION (11) – ETHICS CONSIDERATIONS**

Note that fund disbursement is subject to ethics approval.

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| Ethics Category | Involves?  (A) | IRB / IACUC Approval Required?  (B) | Please declare the participating institutions that require IRB / IACUC approval  indicate “NA” if not applicable. | If (a) = yes and  (b) = no,  please explain why participating institutions do not require IRB / IACUC approval.  indicate “NA” if not applicable. |
| i. Human Subjects |  |  |  |  |
| ii. Use of Human Biological Materials (HBM) primary donors i.e. subjects / volunteers recruited for project |  |  |  |  |
| iii. Conduct tissue banking activities regulated under the Human Biomedical Research Act (HBRA)a, b, c as part of the research study |  |  |  |  |
| iv. Use of health information or research data from primary donors (i.e. subjects / volunteers recruited for project) |  |  |  |  |
| v. Use of commercially available HBM / animal tissues or cells |  |  |  |  |
| vi. Animal experimentation that is not regulated under HBRA |  |  |  |  |
| vii. Requirement for containment class 2 and above |  |  |  |  |
| viii. Multi-Centre Trial(s) |  |  |  |  |

a. Human Biomedical Research Act 2015 <https://sso.agc.gov.sg/Act/HBRA2015>

b. Human Biomedical Research (Tissue Banking) Regulations 2019

<https://sso.agc.gov.sg/SL/HBRA2015-S702-2019?DocDate=20191021>

c. Human Biomedical Research (Tissue Banking and Notification — Exemption)

Regulations 2019 <https://sso.agc.gov.sg/SL/HBRA2015-S704-2019?DocDate=20191021>

Has the necessary ethics clearance been obtained for the proposal?

Please check one of the following.

☐ Yes. A copy of the ethics approval is attached with this application.

☐ No. A copy of the ethics approval will be submitted before the commencement of the project.

☐ NA. Our proposal does not involve the use of any of the above.

**SECTION (12) – SUBMISSION DECLARATION FROM LEAD PI(S) AND CO-I(S)**

I, the undersigned, declare that:

1. all information is accurate and to the best of my knowledge;
2. this is an original and latest version of the proposal;
3. similar versions or part(s) of this proposal have not been sent to other agencies for funding;
4. we agree to abide by the terms and conditions governing the award of research grants set out by A\*STAR;
5. we do not have any conflict of interest with the industry partners (company(s) and company executives) as listed in this proposal;
6. we agree to hold primary responsibility for the responsible conduct of research, and shall abide and comply with the ethical, legal, and professional standards relevant to research, in accordance to the research integrity policy of the Host Institution; and
7. we comply with the provisions of any relevant laws of the Republic of Singapore, statutes, regulations, by-laws, rules, guidelines and requirements applicable to it, as well as all applicable policies and procedures adopted by A\*STAR as the same may be amended or varied from time to time;

We also declare that the following documents have been submitted, in this application (please tick accordingly):

☐ Full Proposal (insert Name of Lead PI) (**mandatory**)

☐ Appendix A1. References (**mandatory**)

☐ Appendix A2. Key Publications (**mandatory**)

☐ Appendix B. Compilation of Curriculum Vitae (**mandatory**)

☐ Appendix C. Proposed Budget (**mandatory**)

☐ Appendix D. Other Grant Support (Detailed) (**mandatory**)

☐ Appendix E. Letters of Commitment (*where applicable*)

☐ Other Documents (please list down below):

Please fill in, inserting rows where necessary and sign inside the boxes.

|  |  |
| --- | --- |
| **Institution** | **Principal Investigator(s) /Co-Investigator(s)** |
| [Name of Institution] | [Name, Signature and Date] |
| [Name, Signature and Date] |

**SECTION (13) - DECLARATION FROM DIRECTOR OF RESEARCH OR EQUIVALENT OF HOST INSTITUTION(S)**

It is certified that:

the Institution agrees to participate in this project;

the Institution shall provide necessary facilities for implementing the project;

the Institution assumes financial and other management responsibilities for the duration of the project to be carried out at their institution; and

The back-up funding for manpower, consumables, etc. is available.

Please fill in and sign inside the boxes:

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| --- | --- | --- |
| **Institution** | **Endorsement by Host Institution’s Office of Research (ORE) Director of Research or its equivalent** | **Endorsement by I&E Office (where applicable)** |
| [Name of Institution] | [Name, Signature and Date] | [Name, Signature and Date] |

1. Guideline on Company Enterprise Type

   Foreign-MNC: <30% locally owned OR Parent company operates in more than one country (via subsidiaries); Annual Sales Turnover of >S$100m; AND >200 employees

   Foreign-Others: <30% locally owned

   Local-LLE: >30% locally owned AND Annual Sales Turnover of >S$100m AND >200 employees (includes GLCs, e.g. ST Engineering, SembCorp, Keppel, SIA)

   Local-SME: >30% locally owned AND Annual Sales Turnover of <S$100M OR <200 employees

   Local-Public Agency / Ministry or statutory board, e.g., MOM, HDB, LTA, DSO.

   VWO: Voluntary Welfare Organisation (VWO) – Non-profit organisation that provides welfare services and/or services that benefit the community at large, e.g., NKF. [↑](#footnote-ref-1)