**Exploiting Distributed GEneration (EDGE) Programme**

**Request for Proposal (RFP)**

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| **Research Areas** | **EXPLOITING DISTRIBUTED GENERATION**1. Directed Call for Proposals on Probabilistic grid planning, interconnected micro-grids and design of micro-grids.
2. Directed Call for Proposals on Differentiated services/ Heterogeneous Power Quality
3. Directed Call for Proposals on Micro-grid optimization (w.r.t. to the electricity market) and Energy Management
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| **RFP Number** | TIE RFP 1 |
| **Category** | Directed Call |
| **Open Date for Proposal** | **30 Oct 2018** |
| **Close Date for Proposal** | Both soft and hard copies of the proposals MUST be submittedSoftcopy submissionProposals and all accompanying attachments **MUST** be submitted in **PDF format to** EDGE@SingaporeTech.edu.sg by **27 Feb 2019 (Wed), by 1200 hrs (noon) Singapore Time (UTC +08:00).**Hardcopy submissionTwo hardcopies of the proposal and all accompanying attachments **MUST** be submitted by **1 Mar 2019 (Fri), 1200 hrs (noon) Singapore Time (UTC +08:00)**. Please send the documents to the Contact below. |
| **Address for submission of hard copy proposals** | The full proposals (with all necessary attachments) must be hand delivered to Ms Yvonne Chee in person (Tel: 6592-1403) at the following address:EDGE Programme Office Technology, Innovation and Enterprise (TIE) DivisionSingapore Institute of Technology10 Dover DriveSingapore 138683 |
| **Other Instructions** | For more information, please refer to: [www.singaporetech.edu.sg/EDGE](http://www.singaporetech.edu.sg/EDGE). If you have any queries, please send them to the EDGE Programme Office at EDGE@SingaporeTech.edu.sg. |

 **CALL FOR PROPOSALS: EXPLOITING DISTRIBUTED GENERATION**

# Background

1. This grant call aims to advance applied research and development (Applied R&D) in industry-relevant areas which would enhance the adoption and exploitation of distributed power generation in Singapore.
2. To achieve this goal, there is a need to:
	1. Enhance Singapore’s power engineering capabilities, focusing on micro-grids and distributed energy resources through open grant calls to support collaborative research between Institutes of Higher Learning (IHLs) and the industry. Areas include micro-grid energy management systems, control and optimization; interconnected micro-grids design and probabilistic grid planning; and heterogeneous power quality.
	2. Build up capabilities to operate and manage a micro-grid testbed at SIT Punggol. The Campus Micro-grid, when ready in 2023, will be a national infrastructure, open to the industry and academic for research, development and demonstration (R&D) – allowing technologies developed in Singapore to be validated in real-world conditions, bridging the chasm between R&D and commercialisation. The full-featured microgrid at SIT Punggol will be one which can cooperate and interoperate with the utility grid with seamless and controlled transitions between utility-connected mode and islanded mode.

# Scope of Grant Call

1. The EDGE Programme Office in Singapore Institute of Technology invites submission of proposals for applied R&D projects that will strengthen and develop new capabilities in the areas of distributed generation to prepare Singapore for a decentralised energy system, through electrical power engineering. Proposals can also include social sciences, such as design thinking, psychology and human behavior, as these domains are playing increasingly pivotal roles in the deployment of energy sector innovations.
2. Through extensive consultation of industry players, IHLs and Research Institutes (RIs), we identified several problem statements and clustered them into three domain areas for this grant call. Selected problem statements (i.e. non- exhaustive) are listed below for reference. Interested parties are welcomed to propose other problem statements that meet the grant call’s objectives.
	1. **Interconnected Micro-grids Architecture Design and Probabilistic Planning** -Developing the most optimal structure and topology for interconnecting the micro-grids and probabilistic method that considers cost, voltage and frequency of interconnection, economics and stability of micro-grids with variable renewable energy sources and energy storage.et f innov
		1. How can we develop the most optimal structure and topology for the grid of the future using micro-grids?
		2. How can we seed the evolution of grid planning for deterministic to probabilistic reliability criteria using micro-grid test-bed as a starting module?
	2. **Differentiated services/ Heterogeneous Power Quality**

Developing different technologies and methodologies on the micro-grid to cater to loads with heterogeneous power quality needs in the most economical way.

* + 1. Propose an economic analysis for meeting requirements of sensitive loads by local provision of high quality power through heterogeneous power vs. increasing quality of universal homogeneous supply stream.
		2. How can we seed the evolution of power system which differentiates power quality based on requirements of society and the digital economy using micro-grids as a modular use case.
	1. **Micro-grid optimization (with respect to the electricity market) and Energy Management** – Developing micro-grid control system and strategy for multiple interconnected micro-grids that ensures economic and reliability benefits.
		1. How can we demonstrate economic and reliability benefits of optimisation methods on micro-grid through the use of smart control systems and data analytics.
		2. How do we develop reliable control and manage reverse power flow (e.g. injecting electricity into the main grid) to cater for the growth of distributed generation in Singapore.

# Eligibility, Funding Support and Other Important Information

1. This grant call is open to research consortia comprising IHLs, RIs, public sector agencies, not-for-profit organisations and private sector companies. In line with EDGE’s focus on near-to-market and industry focused innovations, **proposals shall be led by a Host Organisation**. Host Organisation refers to a **company under the Companies’ Act** and is in the energy and power related industries. To encourage stronger partnership with Singapore’s research community, consortia comprising multiple IHLs and RIs are strongly encouraged.
2. Proposals shall not be funded or be currently considered for funding by other agencies.
3. Funding awarded cannot be used to support overseas research activities. All funding awarded must be used to carry out the **research activities in Singapore**.
4. Proposals will be funded up to 50% of the approved qualifying costs in cash. Companies that are involved in the proposals shall contribute at least 10% of qualifying costs in cash. SIT will also provide additional in-kind contribution (up to another 20% of the approved qualifying costs).
5. Successful IHLs, RIs and / or not-for-profit entities would be eligible for indirect costs (i.e. up to 20% of total qualifying costs as indirect costs).
6. Budget for the entire project shall be broken down into the following broad categories, mainly: (a) expenditure on manpower (EOM); (b) equipment; (c) other operating expenses (OOE); (d) overseas travel, and (e) research scholarship. Please refer to Annex A for the list of non-fundable costs when proposing the project budget.
7. The project may include research collaborations with local or overseas organisations. However, contracting out the whole or substantial part of the research work is not permitted.
8. Collaborators are not permitted to receive, directly or indirectly, any part of the funding, whether in cash or in the form of assets acquired using the funding or otherwise. All assets acquired using the funding must be located in Singapore and maintained within the control of the grantees.
9. The project duration, including completion of the final report and all miscellaneous project activities, shall not exceed **three (3) years**. The proposed project schedule must be realistic, allowing sufficient time for the preparation of final report and for the review of project results.

1. The parties agree that all rights, title to or interest in, all Foreground IP created by the project team shall vest in the project team in a manner that is mutually agreed between the project team and as documented in the Research Collaboration Agreement before the research commences.
2. The Government and public sector agencies shall reserve a non-exclusive, non- transferable, perpetual, irrevocable, worldwide, royalty-free right and licence to use, modify, reproduce and distribute the Foreground IP (i.e. IP arising from the awarded projects) for non-commercial, R&D and/or educational purposes only.
3. Projects must include a test-bedding phase at Pulau Ubin or at a location site that is jointly agreed by Lead PI and SIT, and eventually facilitate capability development and translated to SIT’s Punggol Campus micro-grid, a national infrastructure open to industry and academic partners for test-bedding and validation of solutions. Projects should involve SIT’s Faculties as Co-PIs / Collaborators.
4. Proposals will also be evaluated against the following criteria:
	1. High-technical-merit research and innovation that is novel, internationally competitive, directly addresses the identified challenge(s), and can lead to breakthrough results;
	2. Economic benefits to Singapore in terms of capabilities and manpower development, as well as commercialisation spin-offs;
	3. Strong and clear demonstration of potential commercial viability and economic advantage of the proposed solution over existing technologies and practices;
	4. Excellent execution by an experienced research team with a good track record and whose members have the relevant and complementary expertise.

# Application and Evaluation Process

1. This Request for Proposal (RFP) is a one stage process.
2. The Lead Principal Investigator (Lead PI) should fill up the proposal’s details in accordance to the stipulated application template. The proposal and the supporting documents MUST be sent to the EDGE Programme Office.
3. This will be followed by the final selection of proposals for award by an International Project Evaluation Panel (PEP).

# Submission

1. The Lead PI should fill up the proposal’s details in accordance to the stipulated application template. The proposal and the supporting documents **MUST** be sent in PDF format to EDGE@SingaporeTech.edu.sg by **27 Feb 2019, Wed** **(12 noon)**. **TIE will not entertain any submissions after the specified call deadline or any requests to extend the endorsement deadline.**
2. In addition, **two** hardcopies of the proposals and the supporting documents **MUST** be submitted to TIE (Address to: EDGE Programme Office, Technology, Innovation & Enterprise Division, Singapore Institute of Technology, 10 Dover Drive, Singapore 138683) by **1 Mar 2019, Fri (12 noon).**
3. Full Proposal must be endorsed by the Chief Executive Officer / Chief Technology Officer (or equivalent) of the Lead PI’s Host Organisation.
4. Should there be any discrepancy in the contents between the softcopy and hardcopy submissions, the softcopy version shall be taken as “final” and evaluated accordingly.

# Result

1. Successful Full Proposals which are accepted and approved could expect notification by **Q4 2019**. Awarded projects will commence thereafter.

# End

**Annex A**

**GUIDE ON PROJECT COST ITEMS**

**Non-Fundable Direct Costs**

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| **Type of Expenses** | **Description** |
| **Expenditure on Manpower (EOM) Related Expenses** |
| General policy | The general principle is that grants should support EOM costs and related benefits (as per employment contract) as long as it is in line with the consistently applied Host Organisation’s HR policies.This will extend to Host Organisation policies that govern staff recruitment and related costs (e.g. costs associated with the onboarding of staff, staff insurance, overtime claims, staff relocation, employment benefits, employment levy, employment pass, pre-examination medical check-up and housing allowance.)All Manpower related costs that fall under Other Operating Expenses (OOE) should be accurately reflected in the budget. These include visiting professors/experts and professional fees (including fees to consultants).Fractional charging for staff costs based on time commitment to the project must be practised. |
| Principal Investigator/ Co-Investigators EOM cost | Not allowable. |
| Unconsumed leave | Provision for unconsumed leave is not allowable. |
| Student Assistants/Interns | Not allowable for students who are recipients of existing awards (or stipends) or students who are not residents of Singapore.Only full-time students enrolled in local institutes of higher learning qualify to be supported as a student assistant/intern. |

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| **Type of Expenses** | **Description** |
| **Equipment Related Expenses** |
| General policy | Applicant shall provide the basis and justification for the purchase of any equipment in addition to the following information must be provided for the consideration of funding:* the purpose of the equipment,
* how it would be applied to the project, and
* formal established and consistently applied policies of the Host Organisation on equipment purchase.

Applicant shall declare whether similar equipment currently exists within the organisation for each piece of equipment that is proposed to be purchased. For equipment, which already exists within the organisation, the Applicant shall make internal arrangements to use or rent the equipment.No purchase of equipment is allowed unless specifically provided for in the grant approved by TIE.The procurement of such equipment must be made according to the formal established and consistently applied policies of the Host OrganisationThe invoices for all claims must be dated before the end of the qualifying period.Shortlisted applicants are expected to provide quotations as per their proposed budget. |
| Cost of capital works, general infrastructure, general purpose IT and communication equipment, office equipment, and furniture and fittings | Not allowable under indirect costs, unless specifically provided for in the grant and approved by TIE.Examples of such costs are computers, office productivity softwares, PDAs, mobile phones, photocopier machines, workstations, printers, etc. |

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| **Type of Expenses** | **Description** |
| **Other Operating Expenses (OOE) Related Expenses** |
| General policy | Not allowable for expenses that are not directly related to the project.All procurement of such items must be made according to the formal established and consistently applied policies of the Host Organisation. |
| Visiting Professors/Experts | Not allowable unless specifically provided for in the grant and approved by TIE. Each visiting professor/expert must be identified and his/her contribution to the project must be clearly defined and described in the proposal. |
| Audit fees | Not allowable. This includes both internal and external audit fees. |
| Entertainment & Refreshment | Not allowable. |
| Fines and Penalties | Not allowable. |
| Legal Fees | Not allowable. |
| Overhead Expenses | Not allowable unless specifically provided for in the grant and approved by TIE based on the nature of the research. This includes rental, utilities, facilities management, telephone charges, internet charges, etc. |
| Patent Application | Not allowable.This includes patent application filing, maintenance and other related cost. |
| Professional Membership Fees | Not allowable.This applies to Principal Investigator and Co-Investigators as well as all research staff funded from the grant. |
| Software | Not allowable under direct cost unless specifically provided for in the grant and approved by TIE. |
| Professional fees (including fees to consultants) | Not allowable unless specifically provided for in the grant and approved by TIE. |
| Staff retreat | Not allowed. |

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| **Type of Expenses** | **Description** |
| **Overseas Travel Related Expenses** |
| General policy | Not allowable unless specifically provided for in the grant and approved by TIE.Conference participation should be directly relevant to the research area outlined in the project and necessary to accomplish project objectives.All travel must align to the existing and consistently applied Organisation’s travel policies regardless of the source of funds.  |

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| **Type of Expenses** | **Description** |
| **Research Scholarship** |
| General policy | Not allowable unless specifically provided for in the grant and approved by TIE.Postgraduate stipend must align with the prevailing rates set by the Ministry of Education. Postgraduate stipend and tuition support will not attract indirect costs. |
| Undergraduate stipend and tuition support | Not allowable. |