

Lien Environmental Fellowship

The Nanyang Environment and Water Research Institute (NEWRI), Nanyang Technological University, Singapore is pleased to invite applications for the Lien Environmental Fellowship (LEF) Award.

LEF aims to enable successful applicants from universities, research institutions, government agencies, non-government organisation and non-profit organisation based in Southeast Asia, and South Asia to improve water, sanitation, environmental quality assessment and/or solid waste management for their home communities by developing and implementing scalable and sustainable technology-based solutions.

The program emphasises on full-scale implementation and education, so that benefits can accrue beyond the award recipients and towards the communities.

LEF is funded by the Lien Foundation (www.lienfoundation.org) and is administered by NEWRI.

For further information on this program, please refer to the following pages.

Please email your proposals and all enquiries to newricomm@ntu.edu.sg.

The deadline for submission of the Project Brief is **15 November 2022**. Should applicant need additional time, please write to NEWRIComm for approval. The announcement of shortlisted applicants will be notified via email by 4 January 2023.

Application Package - Table of Contents

Lien Environmental Fellowship (LEF)	2
LEF Program Structure	3
FELLOWSHIP PHASE	4
IMPLEMENTATION PHASE	5
MONITORING PHASE	6
How to Apply for LEF Award.....	7
Project Evaluation Criteria	8
ANNEX I – Frequently Asked Questions.....	9
ANNEX II – About NEWRI.....	10
ANNEX III – LEF Project Portfolio	11



What is the Lien Environmental Fellowship?

The Lien Environmental Fellowship (LEF) program is an initiative by the Lien Foundation and the Nanyang Technological University (NTU), started in 2010. Administered by the Nanyang Environment and Water Research Institute (NEWRI), a pan-university institute of NTU with over 300 faculty, researchers, staff and students, the LEF program enables collaborative education and experience with leading environmental and engineering experts. Through NEWRI's philanthropic unit, funded by an endowment sponsored by the Lien Foundation and government of Singapore, NEWRI Community Development (NEWRIComm) provides program funding and coordination of the LEF program.

NEWRIComm seeks to support under-served communities to develop and implement water, sanitation and/or environmental solutions for long-term sustainability and benefit for the community. Of particular interest, are novel technologies and applications that build upon NEWRI expertise (www.ntu.edu.sg/newri).

Who can apply for the LEF Award?

Full time employee from universities, research institutions, government agencies, non-government organisation and non-profit organisation in project location.

The LEF Award is offered to institution/ organisation, not individuals. The main applicant shall be the Project Coordinator/ Principal Investigator, "LEF Fellow".

Where is the project location?

Countries in South East Asia and South Asia

What are the project scopes?

The programme support project scopes may include but not limited to; clean water supply, wastewater treatment, water reuse, water quality monitoring, solid waste management, resource recovery/recycling and/or waste to energy and education programs for underserved communities.

The programme does not support pure-research projects, commercial projects or development of proprietary technologies for commercial set up. Past successful projects can be found here ([https://www.ntu.edu.sg/newri/programmes/newri-community-development-\(newricomm\)](https://www.ntu.edu.sg/newri/programmes/newri-community-development-(newricomm))).

LEF Philosophy

The LEF philosophy does not encourage the donation of only devices and counting direct beneficiaries in projects. We encourage ecosystem approach where upstream and downstream of the community are part of the solution. Education component articulates the sharing of responsibilities among the “receiving” partner, a local partner capable of absorbing the knowhow, the local government, and NEWRI. In such a setting the impact exceeds the change brought to the direct beneficiary but also to the technical partner who shall be able to further disseminate the know-how, and the awareness planted in the authorities and oftentimes thereafter leading to further action beneficial to environmental sustainability. While the LEF program provides funding for the initial capital, the community is expected to demonstrate a viable business model to sustain its long-term operational costs.

What does the award support?

Core activities supported by the LEF program are:

Training Environmental Leaders

Incubator for environmental management solutions in South East Asian and South Asian developing communities through knowledge sharing with academia, government and communities.

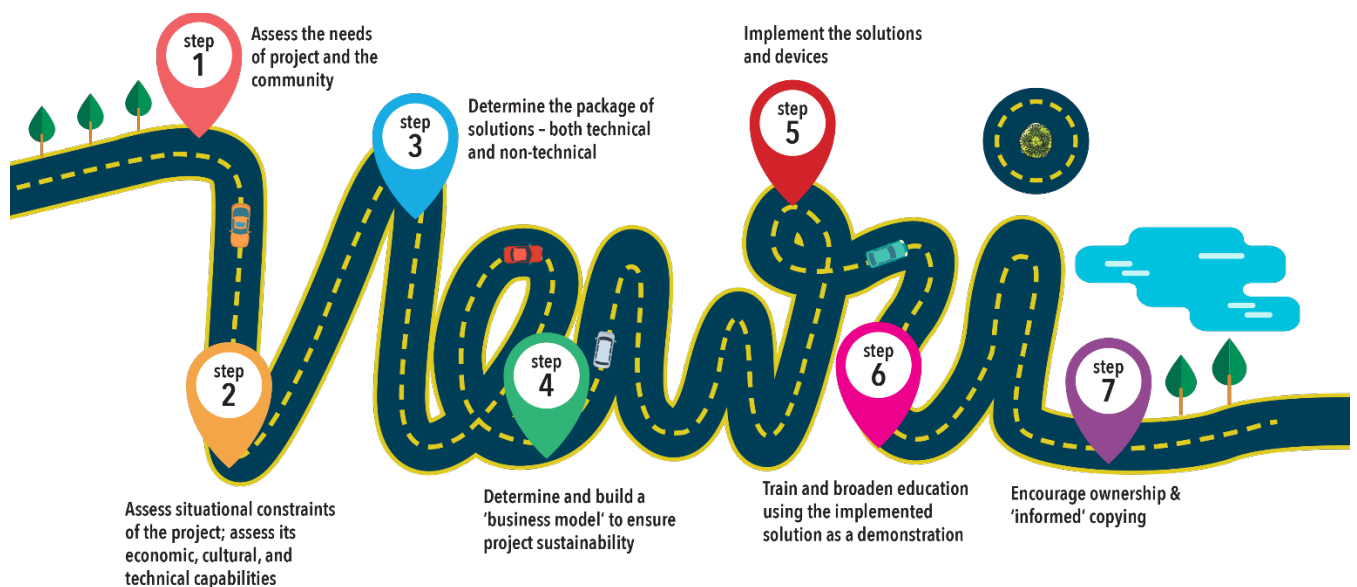
The initiative argues for identifying candidates who are working at universities, research institutions, government agencies, non-government organisation and non-profit organisation and have the desire to help their community.

Implementation of Development Projects

Provides funding and capacity building for solution implementation with local stakeholders.

A crucial element in the assessment will be commitment of the community to participate and take ownership of the project.

Tapping on NEWRI’s strengths in research and engineering, LEF project activities typically encompass:



LEF Program Structure

An LEF Project is typically made up of three consecutive phases:

1. Fellowship (up to 6 months, average cash funding SGD 50,000)
2. Implementation (up to 24 months, average cash funding SGD 250,000)
3. Post Project Monitoring (up to 12 months, average cash funding SGD 40,000)

The amount of funding awarded should be fully justified by scope of work and subjected to tender requirements.

Continuation to the following phases is conditional on the results of the preceding phase.

It is advised that projects are reasonably scoped, such that outputs can be delivered within the timeframe.

FELLOWSHIP PHASE

The Fellowship Phase supports field study and solution development activities in preparation of implementation:

- Project Coordinator of selected projects ("LEF Fellow") will conceptualise their ideas with local stakeholders, NEWRI professors, engineers, and researchers;
- Typical activities include field research, community surveys, pilot testing, and detailing of implementation plans;
- Activities are conducted at NEWRI, recipient's institution, or on site, as deemed necessary;
- During the Fellowship Phase, the Fellow may also attend training, seminars, and participate in site visits. These are intended to help the recipient's future efforts in implementing his project, and in education and research upon returning home.

The Fellowship Phase Award supports the following:

- A monthly allowance of S\$2,500 for the duration of the recipient's stay at NEWRI. Whenever the fellowship phase is carried out at Fellow's home institution, the allowance shall be pro-rated according to time spend recorded;
- Cost of travel from the recipient's country to Singapore, for the purposes of discussions and project activities conducted in Singapore;
- Accommodation shall be provided (on-campus whenever possible) for activities carried out in Singapore;
- Laboratory and prototyping costs.

Key deliverable of the Fellowship Phase will be the Implementation Proposal, which shall be presented to NEWRI assessment panel for evaluation.

The Implementation Award will be given to projects deemed to merit further support.

IMPLEMENTATION PHASE

Implementation Phase follows formal acceptance of the Implementation Award.

The Implementation Phase supports the implementation of solution on-site:

- Call for tender;
- Selection of contractors & assessment of engineering, procurement, construction (EPC) proposals;
- On-site implementation;
- Operators & community training;
- Formal handover to community.

The Implementation Award supports the implementation of solution on-site.

- Capital cost of implementation, "Capex";
- Cost of field operations, such as on-site supervision and on-site testing (e.g. manpower, transport, equipment, consumables);
- Honorarium for LEF Fellow and project team members, pro-rated based on roles and responsibilities and time spent on project activities;
- Cost of travel from the recipient's country to Singapore, for the purposes of discussions and project activities conducted in Singapore;
- Accommodation shall be provided (on-campus whenever possible) for activities carried out in Singapore;

Key Deliverables of this Phase are:

- Successful implementation and commissioning of solution (technology) on-site;
- Capacity development of local stakeholders to ensure that the community have the skills and know-how to operate and maintain the technology;
- Proper handover of facility to local authorities or local communities;
- Proposal for monitoring program.

MONITORING PHASE

A 12-month Monitoring Phase can begin immediately after completion of the Implementation Phase.

The Monitoring Phase supports monitoring activities and verification of results:

- Environmental Quality ie.(Water quality/ sanitation improvements)
- Monitoring of performance of technologies deployed;
- Community surveys;
- Outreach & education activities.

The Monitoring Phase Award supports the implementation of solution on-site.

- Facility optimisation, where required;
- Project operations costs up to four observation visits (e.g. manpower, transport, field work expenses for monitoring team);
- Honorarium for LEF Fellow and project team members, pro-rated based on roles and responsibilities and time spent on project activities;
- Community surveys;
- Outreach and educational activities.

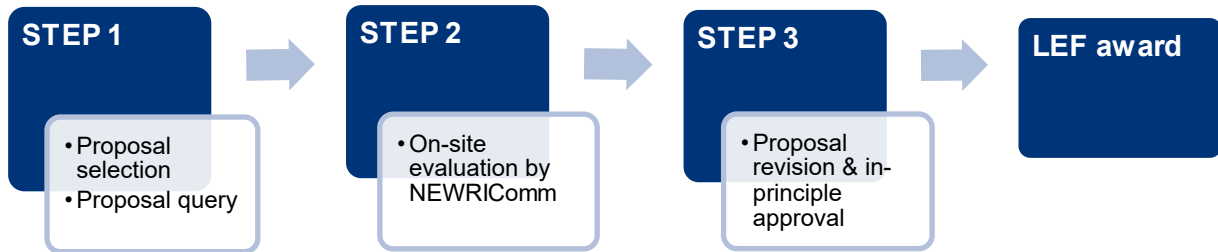
Key Deliverables of this Phase are:

- Project final report including impact analysis.

Projects deemed fit for expansion shall be considered for further support by invitation.

How to Apply for LEF Award

Applications will undergo three stages of evaluation:



STEP 1

Interested applicants are required to submit a **Project Brief** and Principal Investigator's CV. Format of the project brief is available with NEWRIComm.

Project summary should clearly outline the problem, the proposed solution, and the work plan. Supporting pictures or documents can be submitted as appendices.

Applicants shall be informed of the outcome of their applications by 15 November 2022 via e-mail. During this period, project development discussions with NEWRIComm team will begin, via e-mail or teleconference.

STEP 2

NEWRIComm shall arrange a visit to meet stakeholders and conduct on-site assessment for shortlisted applications.

STEP 3 & Award

A full proposal is to be developed in discussion with NEWRIComm and to be submitted by 31 January 2023.

The full proposal shall be assessed by the NEWRI Selection Panel. The final approved proposal ("Approved Application") forms part of the Award agreement.

Successful applicants shall be informed of the decision by 01 March 2023. A letter of award and award terms and conditions shall be sent, requiring formal acceptance by the applicant.

Project Evaluation Criteria

(a) Matching of project scope with NEWRI's expertise.

Project must match one or more of NEWRI's field of expertise, in the domain of Water, Wastewater, Waste and the Energy-Water nexus.

(b) Matching of project scope with that of LEF Program.

LEF Program supports non-profit application of science, engineering, and technology to benefit community, community education, and capacity building.

(c) Sound concept of the solution, technically and socially, demonstrating awareness of root causes of the problem targeted, and sensible strategy in solving the problem.

The Program seeks to support scalable/ replicable solutions with good chance of being implemented at community level and with foreseeable long-term, far-reaching impacts at ecosystem level.

(d) Sustainability & scalability of the solution.

Proposals should demonstrate consideration of sustainability and replicability of the solution, for example:

- *Can the immediate benefiting community operate and maintain the system after the project team leaves?*
- *Can neighbouring communities copy the solution?*
- *Can the solution tie together concern for the carrying capacity of the natural system with social, political, environmental and economic challenges?*

(e) Commitment of support from institution, local authorities, and community.

The Program prioritises proposals which demonstrating the following qualities:

- *The project should not run counter to prevailing local rules and regulations;*
- *Support from local authorities;*
- *Attention and commitment to community engagement;*
- *Commitment and enthusiasm of benefiting communities and local partners, reflected in co-financing or in-kind support.*
- *Capacity for innovation, implementation feasibility, and sustainable development;*
- *Provision of support for project administration (documentation, bookkeeping, etc.)*

(f) Manageability of scope, timeline, and budget

Proposals which demonstrate due planning of work flow, timeline, schedule of deliverables, and budget have greater chances of gaining support from the Program.

ANNEX I – Frequently Asked Questions

(a) Is the LEF award given to individuals, or institute?

The LEF award is given to the institution.

(b) What is the duration of commitment?

2.5 years at the least. Typically, Fellowship Phase, Implementation Phase, and Monitoring Phase each has an average duration of 6 months, 12 months, and 12 months.

(c) Is progression of the award from fellowship to implementation and to monitoring guaranteed?

Progression shall be considered on a case-by-case basis. Nevertheless, each application is assessed strongly based on its potential for implementation and scalability; this is in alignment with the LEF program philosophy that projects should move into implementation stage such that the community can benefit.

(d) What is the maximum financial support provided by the LEF Award?

Fund requests are currently assessed against average amount awarded to previous projects.

- The Fellowship, Implementation, and Monitoring Phase Awards are on average SGD 50,000, SGD 250,000, and SGD 40,000 respectively;
- Funding beyond the typical project budget will be considered if strong justification is provided.
- All eligible projects would be subject to rigorous budget review.

While it is expected that a large portion of the project cost is covered by the LEF Award:

- Limited funding is available to support projects;
- Considering the philanthropic and non-profit nature of the project, co-funding, in-kind support from applicants' institutions, partner organisations, and the community is essential. Such support count in assessment of project proposals.

(e) Who owns the intellectual property (IP) rights developed through the project?

IP developed through the project shall belong to the Nanyang Technological University (NTU), as its development are deemed substantial use of the University's resources.

However, NTU grants the Recipient Institution a revocable-for-cause, worldwide, perpetual, non-exclusive, royalty-and-license-fee-free right and license to use or adapt the IP for non-profit research and academic purposes and any other non-profit philanthropic purposes only.

(f) Publicity & publication rights

All LEF project publicity and publication require prior written consent of NEWRIComm. Every public announcement, press release or publication will acknowledge the funding support given through the program.

ANNEX II – About NEWRI



The Nanyang Environment & Water Research Institute (NEWRI) is a recognised global leader in providing solutions for problems related to water, wastewater, sanitation and renewable bioenergy. NEWRI is globally ranked among the top research organisations in the environment & water domain and is part of the Nanyang Technological University, Singapore.

It carries engineering and deployment capabilities in addition to its discovery capability and has stayed in close contact with the needs of community and industry. NEWRI's know-how and solutions have been deployed at full-scale in field settings for both industry and community (administered by NEWRI units NEWRI Tech and NEWRI Comm respectively). This is to ensure benefit to its stakeholders beyond knowledge generation by the academic community for the academic community.

NEWRI's five (5) research domains look at real-life problems from a fundamental science perspective and devises practical solutions in the following:

1. Membrane Technologies

- Novel Membranes, Enhanced Module & System design, Fouling Controls & Sensors, Novel Membrane Bio-reactors (MBRs).

2. Resource Recovery

- Chemical Stabilisation, Gasification, Air Pollution Control, Energy & Resource Recovery.

3. Biotechnology & Bioprocesses

- Energy self sufficient wastewater reclamation processes, Energy and resource recovery from biosolids with volume minimisation, Modularized aerobic or anaerobic membrane bioreactors.

4. Modelling and AI

- Modelling & Hydrodynamics, Sensors & Networks, Artificial Intelligence & Machine Learning.

5. Environmental Chemistry & Materials

- Advanced oxidation processes, Catalysis, Sorption, Resource Recovery.

To ready NEWRI's know-how and innovations for adoption, the Innovation Cluster of three (3) Applied Research and Translation Centres – ART Centers, de-risks from the research level to the pre-commercial state, effectively bridging between research and deployment.

6. Separation Technologies Applied Research and Translation, ST-ART (website)

The ST-ART Centre is a National Facility supported by Economic Development Board (EDB) of Singapore to collaborate with institutes of higher learning, research entities, and industrial partners for scaled-up Separation systems.

Website ([https://www.ntu.edu.sg/newri/research-capabilities/separation-technologies-applied-research-and-translation-\(start\)](https://www.ntu.edu.sg/newri/research-capabilities/separation-technologies-applied-research-and-translation-(start)))

7. Waste-to-Energy Applied Research and Translation, WtE-ART

WtE-ART is supported by the National Environmental Agency (NEA) of Singapore and involves a 11.5 tonnes-per-day gasification with melting facility for solid wastes and sludge management.

Website ([https://www.ntu.edu.sg/newri/research-capabilities/waste-to-energy-research-facility-\(wte-art\)](https://www.ntu.edu.sg/newri/research-capabilities/waste-to-energy-research-facility-(wte-art)))

ANNEX III – About NEWRIComm

NEWRIComm – Creating a better shared future in Asia

([https://www.ntu.edu.sg/newri/programmes/newri-community-development-\(newricomm\)](https://www.ntu.edu.sg/newri/programmes/newri-community-development-(newricomm)))

The Nanyang Environment and Water Research Institute (NEWRI)'s philanthropic arm, NEWRI Community Development (NEWRIComm) administers the Lien Environmental Fellowship (LEF), flagship program of the second phase of the Lien Foundation - NTU Environmental Endeavour collaboration.

NEWRIComm works to create a better, shared future in Asia through partnership, capacity building, and holistic innovations in environment and water technologies. Tapping on NEWRI's strength in scientific research and engineering, projects address five levels of objectives – individual beneficiaries, benefitting community, facilitate education, achieving a balanced ecosystem, and enabling healthy waterbodies.

NEWRIComm's capabilities covers three following segments; strategic outreach, project management and engineering support.

Support of NEWRIComm Project Manager

- **Planning**
Liaise with LEF Fellow on defining project scope and measurable goals and explore with LEF Fellow on project expansion
- **Budget Development**
Monitoring cost estimate and verify quarterly expense report submitted and develop fund schedule and payment breakdown
- **Activity Planning & Sequencing**
Establish critical path and construct activity sequence and identify constraints and assumption
- **Risk Management**
Forecast and analyse risk potentials with LEF Fellows and mitigate risks where applicable
- **Resource Allocation**
Validate resource requirement and manage budget for all resources
- **Quality Control**
Ensure proper documentation according to NTU and LEF Fellow's Institution guidelines coupled with weekly updates and site visits to validate progress and resolve challenges

Support of NEWRIComm Engineering Team

- **Overall Solution Design**
Support and verify construction drawing and design parameters
- **Schedule of Rates**
Tabulation of price of commodities across LEF countries and assist LEF Fellow in cost estimation
- **Onsite Safety Management**
Liaise with LEF Fellow to develop safe work procedure and risk assessment onsite
- **Operations Optimisation and Maintenance**
Develop data monitoring solutions (IoT) and provide support for optimising parameters and forecasting OPEX
- **Troubleshooting**
Provide expertise on rectifying errors onsite and inculcate good work practices to community
- **Quality Control**

- Ensure work done onsite is up to standard in order to minimise reworks
- Inspection and Checklist
Verify and advise Project Managers and LEF Fellow on quality of work completion for cost reimbursement via thorough inspection of work installation

ANNEX III – LEF Project Portfolio

As of 2022, NEWRIComm has 18 projects in nine countries — Bhutan, India, Indonesia, Laos, Myanmar, Nepal, Thailand, Sri Lanka and Malaysia with LEF support, benefitting over 2 million people with its programme. NEWRIComm provide interdisciplinary solutions through academic collaborations and solution implementation with respective communities.

