Republic of the Philippines
DEPARTMENT OF SCIENCE AND TECHNOLOGY
PHILIPPINE COUNCIL FOR INDUSTRY, ENERGY AND EMERGING TECHNOLOGY RESEARCH AND DEVELOPMENT
Sanggunian ng Pilipinas para sa Pananaliksik at Pagpapaunlad ng Industriya, Enerhiya at Bagong Teknolohiya

BAGONG PILIPINAS

17 January 2026

Dear *Researchers and Partners:*

We are pleased to announce the DOST 2026 Call for Proposals for 2028 funding.

For reference and guidance, attached is the Call document for details about the Call timeline, submissions, and the criteria for evaluation. The priority area or call themes under the Industry, Energy and Emerging Technology are found in Annex A of the said Call Document. Researchers are kindly advised to read carefully the Call Document.

Moreover, please be reminded to register first at the DOST Project Management System through the link http://dpmisv2.dost.gov.ph/ which is a pre-requite to the submission of the concept proposal.

Below is the timeline to be observed pertaining to the 2026 DOST CFP:

15 January 2026	North Luzon Call Conference Cauayan, Isabela
29 January 2026	Visayas Call Conference Bacolod City
11 February 2026	NCR and South Luzon Call Conference
24 February 2026	Mindanao Call Conference
1-15 March 2026	Submission of Concept Proposals
16 March – 15 April 2026	Evaluation of Concept Proposals
16 -30 April 2026	Preparation of Full-Blown Proposals
1-31 May 2026	Submission of Full – blown Proposals
1 June – 6 August 2026	Evaluation of Full-blown Proposals
15-17 July 2026	Governing Council Proposal Evaluation Marathon
29 July – 6 August 2026	DOST GIA EXECOM Disposition on the Full-Blown Proposals

Should you need further information and/or assistance, please do not hesitate to contact the following:

- Ms. Grace F. Estillore, Policy Coordination and Monitoring Division gfestillore@pcieerd.dost.gov.ph
- Ms. Carlota P. Sancho, Policy Coordination and Monitoring Division cpsancho@pcieerd.dost.gov.ph

Thank you.

Very truly yours,

Twala Secured
Digitally Signed
JAN-20-2026

DR. ENRICO C. PARINGIT
Executive Director

Philippine Council for Industry, Energy and Emerging Technology Research and Development
IN REPLYING PLEASE CITE
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Republic of the Philippines
DEPARTMENT OF SCIENCE AND TECHNOLOGY
PHILIPPINE COUNCIL FOR INDUSTRY, ENERGY AND EMERGING TECHNOLOGY RESEARCH AND DEVELOPMENT

2026 Call for Proposals for 2028 Funding

Funding opportunity template

Funding opportunity title

DOST and PCIEERD Grants-in-Aid (GIA) Program Call for Proposals for CY2028 Funding

Key information

Type of funding	Grant
Funding Agency	Department of Science and Technology DOST-Philippine Council for Industry, Energy and Emerging Technology (DOST-PCIEERD)
Co-funder(s) *External agencies*	Department of Science and Technology (DOST)
Link to the Concept Proposal Submission	http://dpmisv2.dost.gov.ph
Link to the Full blown proposal submission	DOST Project Management Information System (DPMIS): http://dpmis.dost.gov.ph
Link to the PCIEERD Research Database (simple check to avoid duplication)	https://projects.pcieerd.dost.gov.ph

Timeline

Event	Date	Time
Concept Proposals		
Opening date for submission of **Concept Proposals**	March 1, 2026	8:00 A.M.
Closing date	March 15, 2026	5:00 P.M.

Evaluation Period	16 March – 15 April 2026	
Full-blown Proposals *(endorsed concept proposals only)*		
Opening date for submission **of Full-blown Proposals**	16 May 2026	8:00 A.M.
Closing date	31 May 2026	5:00 P.M.
Start of projects	January 2028	

Overview

The Department of Science and Technology (DOST) and the DOST-Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD) are ready to accept research and development (R&D)/Science and Technology (S&T) proposals for **2026**. This Call for Proposals is for specific priority areas identified in the Harmonized National R&D Agenda (HNRDA) 2023-2028, the priorities identified under the Three-Horizon STI Economic Strategy (2025-2028), and PCIEERD's Roadmap and Action Plan (2021-2028) which is clustered into a program agenda called NEXUS or Nurturing Exemplars of Unified Scientific Solutions.

Guided by the DOST mantra ***"Providing Solutions, Opening Opportunities,"*** the DOST-PCIEERD directs R&D and S&T initiatives that will provide solutions and contribute towards an improved innovation system to leverage economic progress through the formulation of sectoral roadmaps (https://pcieerd.dost.gov.ph/road-maps)

Opportunity summary

This funding opportunity encourages S&T collaboration and applied research among Higher Education Institutes (HEIs), government Research and Development Institutes (RDIs), and non-profit S&T networks and organizations seeking funding for their R&D/S&T initiatives.

Who can apply

Any public and private universities and colleges, Research and Development Institutes (RDIs), R&D Consortia, non-profit laboratories, other public or private non- profit S&T institutions located in the Philippines with proven competence may apply for GIA support of DOST and DOST-PCIEERD and its grant-giving units, provided that projects fall under the specific

research areas with overall goal to benefit Filipinos. Non-profit S&T organizations are those, which: (1) are primarily operated for scientific, educational, service, or similar purposes in the public interest; and (2) are not organized primarily for profit. Non-profit organizations engaged in lobbying activities are not eligible to apply.

What we're looking for

Proposals to be submitted and or funded under this announcement must demonstrate the advancement of Science and Technology, alignment to government's economic policy direction and fall under at least one of the DOST-PCIEERD Priority Programs identified in **Annex A**.

Eligible costs
100% of the project cost shall be covered under the Grant while the applicant's organization shall provide at least 15% counterpart funding, in cash/in kind, except for projects involving public good. Only eligible and allowable costs may be used for counterpart fund and/or in-kind contribution (ex. utility costs, office space rental, etc.), as determined by DOST-PCIEERD. The proposal must describe how the applicant will provide the counterpart fund/in-kind contribution and the role that the Grant will play in the overall project.

The requested budget shall be itemized following the DOST Form 4-Project Line-Item Budget. The grant may cover partial or full cost of the project, both direct and indirect costs which shall include personnel services, maintenance and other operating expenses, and capital outlay that are integral part of the project. All expenditure items shall be in accordance with the Unified Account Code Structure (UACS) and relevant provisions of the DOST Memorandum Circular 003 Series of 2025 or the Guidelines for the Grants-in- Aid (GIA) Program of the Department of Science and Technology (DOST) and its Attached Agencies. DOST MC 003_DOST GIA Guidelines_Nov2025.pdf

Capital or infrastructure expenditure is not an eligible cost under the Grant as well as fees and/or stipends associated with Master and PhD studentships. `

How to apply

The concept proposal shall be submitted through the **DOST eProposal System** within the period **01-15 March 2026**. Evaluation of the concept proposals will be from **16 March to 15 April 2026.**

Only those with approved concept proposals are eligible to submit full blown proposals.
The full blown proposals should be submitted through the DOST Project Management Information System (http://dpmis.dost.gov.ph) from **8:00 A.M. of 1 May 2026 - to 5:00 P.M. of 31 May 2026**.

It will not be possible to submit an application to the call after the time mentioned above. Proposals submitted after the deadline will not be considered. Applicants are encouraged to leave enough time for proposal inputting in the DPMIS before the said date.

When submitting your application, please follow these steps:
1. Register and create an account in the DPMIS
2. Log in to your DPMIS account
2. Select Type of Proposal: PCIEERD GIA Program/Project (2028 Funding)
3. Select Classification: New Proposal

The following will automatically be disapproved:

1) Proposals from organizations that are not qualified to submit during this Call;
2) Proposals outside the priority areas of the Council; and
3) Proposals submitted to any other call route/Council/s.
4) Proposals not submitted through DPMIS, i.e., submission of printed copy of proposals, submission sent through email.

Documents Required

As a summary, your application should include the following documents.

1) DOST Proposal Form
2) Supplementary Files
   Workplan
   Endorsement of Head of Agency
   Gender and Development (GAD) Score Sheet
   Letter of Intent/Letter of Cooperation

No additional attachments are permitted.

Document Summaries

Applicants shall follow the DOST GIA Proposal Format for both the Concept Proposal and the Full-blown proposal (R&D or non-R&D, whichever is applicable) which will be accomplished in the e-Proposal portal at http://dpmis.dost.gov.ph Instructions for submission are also available in this site.

Project Concept Proposal

Example of the Project Concept Proposal format

I. Concept Project Proposal Summary Information
   1. Project Title
   2. Project Duration
   3. Estimated Budgetary Requirement
   4. Principal Research Question to be Addressed
II. Project Leader Profile
   1. Name
   2. Position
   3. Organization
   4. Department/Division
   5. Contact Details
   6. Other Ongoing Projects being handled by the Project Leader
III. Project Profile

1. Cooperating Agencies
2. Sites of Implementation
3. R&D Program/Project (Basic or Applied)
4. DOST Pillars Pursued
5. DOST Thematic Areas Covered
6. Project Summary

The concept proposal is assessed based on the alignment with the call priorities and the NSDB or the Needs, Solutions, Differentiation and Benefits. The following guide questions are used during the evaluation:

Guide Question	Where to do simple check, if applicable
1. Aligned with the Call priorities and the roadmap? (N)	https://pcieerd.dost.gov.ph/road-maps
2. Does the proposal solve or partially solve the identified problem? (S)	
3. Does the proposal identify how it is different from existing and completed technologies? (D)	*https://projects.pcieerd.dost.gov.ph for a simple duplication check*
4. Are the benefits identified? (B)	

Detailed R&D Project Proposal Format

Example of a DOST Proposal Format: R&D

I. Project Profile

Program/Project Title - the identification of the Program and the component projects.

a. **Project**- refers to the basic unit in the investigation of specific S&T problem/s with predetermined objective/s to be accomplished within a specific time frame.
b. **Project Leader**- refers to a project's principal researcher/implementer.
c. **Project Duration**- refers to the grant period or timeframe that covers the approved start and completion dates of the project, and the number of months the project will be implemented.
d. **Implementing Agency**- the primary organization involved in the execution of a program/project which can be a public or private entity

II. Co-Implementing and Cooperating Agency/ies

Refers to the agency/ies that support/s the project by participating in its implementation as collaborator, co-grantor, committed adopter of resulting technology, or potential investor in technology development or through other similar means.

III. Site/s of Implementation

Location/s where the project will be conducted. Indicate municipality, district, province, region, and country.

IV. R&D Program Indicates whether the project is basic or applied.

a. **Basic research**- is an experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundations of phenomena and observable facts, without any particular or specific application or use in view.
b. **Applied research**- is an investigation undertaken in order to utilize data/information gathered from fundamental/basic researches or to acquire new knowledge directed primarily towards a specific practical aim or objective with direct benefit to society.

V. DOST Pillars Pursued

Based on the DOST Pillars, indicate which of DOST Pillars will be pursued:
Human Wellbeing
Wealth Creation
Wealth Protection
Sustainability

VI. DOST Thematic Areas Covered (Check all that apply**)**
Learning, Education, and Culture
Health and Wellbeing
Food and Agriculture
Industrial Solutions and Competitiveness Development
Transport and Mobility
Energy and Utilities System
Environment & Natural Resources
Climate, Disaster Resilience, and Human Security
Governance
Others (please specify)

VII. Executive Summary- briefly discusses what the whole proposal is about (in the DPMIS, it should not exceed 300 words).

VIII. **Introduction**- a formally written declaration of the project and its idea and context to explain the goals and objectives to be reached and other relevant information that explains the need for the project and aims to describe the amount of work planned for implementation; refers to a simple explanation or depiction of the project that can be used as communication material.

VIII.1. Rationale- brief analysis of the problems identified related to the project (in the DPMIS, it should not exceed 300 words).

Significance- refers to the alignment to national S&T priorities, strategic relevance to national development and sensitivity to Philippine political context, culture, tradition and gender and development. This should also contain ***good impact statements*** *that outline how the project will address a significant need, its potential contribution to national development, and how it aligns with DOST-PCIEERD's mission of fostering innovation and scientific advancement.*

VIII.2. Scientific Basis- other scientific findings, conclusions or assumptions used as justification for the research

Theoretical Framework- the structure that summarizes concepts and theories that serve as basis for the data analysis and interpretation of the research data.

VIII.3. Objectives- statements of the general and specific purposes to address the problem areas of the project.

IX . Review of Literature

Refers to the following: (a) related researches that have been conducted, state-of-the-art or current technologies from which the project will take off; (b) scientific/technical merit; (c) results of related research conducted by the same Project Leader, if any; (d) Prior Art Search, and; (e) other relevant materials.

X. Methodology

Discuss here the following: (a) variables or parameters to be measured and evaluated or analyzed; (b) treatments to be used and their layout; (c) experimental procedures and design; (d) statistical analysis; (e) evaluation method and observations to be made, strategies for implementation (Conceptual/Analytical framework).

XI. Technology Roadmap (if applicable)

A visual document that communicates the plan for technology. It is a flexible planning technique to support strategic and long-range planning by matching short- and long-term goals to specific technology solutions.

XII Expected Outputs (6Ps)

Deliverables of the project based on the 6Ps metrics (Publication, Patent/Intellectual Property, Products and Processes, People Services, Places and Partnerships, and Policies)

a. *Publications*- published aspect of the research, or the whole of it, in a scientific journal or conference proceeding for peer review, or in a popular form.
b. *Patents/Intellectual Property*- proprietary invention or scientific process for potential future profit.
c. *Products and Processes*- invention with a potential for commercialization.
d. *People Services*- people or groups of people, who receive technical knowledge and training.
e. *Places and Partnerships*- linkage forged because of the study.
f. *Policies*- science-based policy crafted and adopted by the government or academe as a result of the study.

Public Engagement for S&T Projects - interactions, activities, or initiatives involving individuals, communities, or the public primarily intended to communicate and raise awareness of the S&T initiatives of the Council.

Note:

1. DPMIS accepts only 6Ps. For Public Engagement for S&T Projects, input it under People Services if it contains trainings; under Publications if it contains social media materials, etc

2. Ensure content is aligned to the DOST Form 5 Workplan Section B – Expected Outputs

Potential Outcomes (Refer to DOST M&E Guidelines)

- **MEASURES THE CHANGE THAT HAS OCCURED AS A RESULT OF THE PROJECT**

Innovation Stimulated
Technology adoption are accelerated/sustained
Improved productivity
Resiliency to Disaster
More responsive to the environment

Potential Impacts (Refer to DOST M&E Guidelines)

- **MEASURES THE BROADER CHANGES THAT HAS OCCURRED WITHIN THE SOCIETY, ECONOMY AND ENVIRONMENT**

Economic Growth / Industry Competitiveness
Improved Environmental Condition
Socio-cultural

In the DPMIS, Social & Economic Impacts has two (2) separate fields required for input.

XIII. **Target Beneficiaries**
Refers to groups/persons who will be positively affected by the conduct of the project.

XIV. **Sustainability plan (if applicable)**
Refers to the continuity of the project or how it shall be operated amidst financial, social, and environmental risks.

XV. Gender and Development (GAD) Score
Refers to the result of accomplishing GAD checklists for project monitoring and evaluation/project management and implementation to highlight the contribution of the project in the achievement of the objectives of Republic Act 7192, "Women in Development and Nation Building Act," interpreted as gender-responsive, gender-sensitive, has promising GAD concepts, or GAD is invisible.

XVI. **Limitations of the Project**
Refer to restrictions or constraints in the conduct of the project.

XVII. List of Risk and Assumptions

Risks - refers to an uncertain event or condition that its occurrence has a negative effect on the project.

Assumption- refers to an event or circumstance that its occurrence will lead to the success of the project.

Note: Ensure content is aligned to the DOST Form 5 Workplan Section C – Risks and Assumptions

XVII . Literature Cited
An alphabetical list of reference materials (books, journals and others) reviewed. Use standard system for citation.

XIX. **Personnel Requirement**
Details on the position of personnel to be involved in the project, percent time devoted to the project, and responsibilities.

XX Budget By Implementing Agency
Personnel services (PS), maintenance and other operating expenses (MOOE), and equipment outlay (EO) requirement of the project by implementing agency for Year 1 and for the whole duration of the project. Please refer to the DOST-GIA Guidelines for the details (Section IX.B of DOST Administrative Order (A.O.) 011, s. 2020).

a. **PS**- total requirement for wages, salaries, honoraria, additional hire and other personnel benefits.
b. **MOOE**- total requirement for supplies and materials, travel expenses, communication, and other services.
c. **EO**- total requirement for facilities and equipment needed by the Program.

Notes:

- DPMIS is set for 2026 Salary rates (Refer to DOST AO 958 Series of 2024 – CYs 2024-2027 Prescribed Salary Rates for DOST GIA Personnel)
- Include 20% counterpart funding or in-kind contribution from the implementing agency per year.
- If the proposed LIB contains equipment outlay, include the insurance for the equipment outlay as part of the 15% implementing agency counterpart funding.

XXI. Other Ongoing Projects Being Handled By the Project Leader
List of ongoing projects being handled by the Project Leader funded by the DOST-GIA Program and other sources, and the accompanying responsibilities relevant to the project.

XXII Other Supporting Documents
These include related information on the proposed program/project like, resumes or curriculum vitae, support letters from relevant agencies/organizations, market supply/demand projections, etc. Below are explanations of required information, which should be attached in the proposal. These will also be submitted through the e-Proposals portal.

i. **Workplan**
Describe specific activities and/or methods to be undertaken and estimated timeline for each task.
ii. **Endorsement of the Head of Agency**
iii. **Gender and Development (GAD) GAD Score Sheet**
iv. **Letter of Intent/Letter of Cooperation** from interested adopters of the project results (specifying role/s and monetary/in-kind contribution in the project)

How we will assess your application

For Capsule Proposals:

The following guide questions are used during the evaluation:

Guide Question	Where to do simple check, if applicable

1. Aligned with the Call priorities and the roadmap? (N)	https://pcieerd.dost.gov.ph/road-maps
2. Does the proposal solve or partially solve the identified problem? (S)	
3. Does the proposal identify how it is different from existing and completed technologies? (D)	*https://projects.pcieerd.dost.gov.ph for a simple duplication check*
4. Are the benefits identified? (B)	

For Full Blown Proposals:
A. Review and Selection Process

Proposals shall be evaluated according to a set of criteria for each level of evaluation: Division Level, PCIEERD Management Team (PMT) level, Technical Panel (TP) level, Governing Council (GC) level, and the DOST Executive Committee (EXECOM) level (for proposals for DOST GIA funding) as shown below. Applicants should directly and explicitly address these criteria as part of their proposal submission.

Criteria for PCIEERD-GIA Program funding:

1. Scientific Merit
Contribution to the advancement of knowledge and understanding in the field of Science & Technology.
The research is at par with the existing studies; cutting edge; world class research.
Sound scientific basis to generate new knowledge/innovative technology.
Will contribute to the enhancement/development of skills and expertise in the field/discipline.

2. Methodology
The procedures are clear, well-organized, well-described and based on a sound rationale.
The proposed methods and results are valid, replicable and reliable.
The proposed activities are reasonable to attain its expected outputs.

3. Financial Soundness
The proposed budget is reasonable in the conduct of the research. The expense items sought are appropriate and necessary.
There are adequate counterpart resources available (e.g. expertise, facilities) to carry out the research.

4. Timeframe
The duration of the project and its activities are reasonable.
The workplan is doable in a given timeframe.
The risk management plan was established to avoid delays in the project implementation.

5. Environmental Impact
The project will not pose a significant adverse effect on the environment and/or public health.
Will adhere to Circular Economy Framework and practices

6. Other Issues

Compliance with regulatory requirements is necessary in the conduct of research.
Ethical issues (i.e. do not harm, informed consent, voluntary participation, privacy, anonymity, confidentiality) are properly addressed.

7. Sustainability
The likelihood that institutional, financial, and other resources are sufficient to sustain the project's outcome in a sustainable way. Also, there are potential partners and techno-takers to be involved in the project.

- Research utilization plan under methodology
- Sustainability or business plan particularly those with market potential
- Letter of undertaking / commitment specifying roles/responsibilities and counterpart funding from potential partners, target users or techno-takers

8. Socio-economic Impact
Potential of project to create/provide/generate employment.
Potential to Increase income and productivity
Ability to address any current/pressing national problem, among others, are specified and quantified

9. Marketability
Determine current and potential market demand
Has identified specific/potential end-users
Explore/Create new markets for the resulting product/process/service are specified
Advantage over existing products/services in the market
Potential adoption/use of the industry (manufacturer) and other partners

10. Plans for Research/Project Results Utilization
Plans on how R&D results will be used by the potential end user/s or adopters are defined
Addresses strategic needs/value
Sustainability plan for the resources generated and capacity built from the project

Criteria for Evaluation of Proposals submitted under the Emerging Technology Sectors

A separate set of criteria for evaluation is adopted for projects and programs submitted under the Emerging Technology sector to be more appropriate compared with the existing criteria used for other sectors. This is considering that the technologies are generally new and development and applications are still unrealized.

1. Significance of Research (20%)
   Alignment of the project to global emerging trends
   Contribution of the project to immediate needs
   Potential of the project to address national and local needs
2. Impacts (35%)
   Knowledge Impact
   Environmental Impact
3. Innovation and Results Utilization (40%)
   Technology Roadmap/Development Pathway
   Feasibility, Operations, and Sustainability

Plans on the Use of Research Results
Target Technology Readiness Level upon completion of the proposed Project

4. Project Leader's Track Record (5%)
   R&D Projects Led
   R&D Projects Participated
   R&D Projects Successfully Delivered

Additional Criteria for DOST-GIA Program Funding:

1. Relevance
Aligned to national S&T priorities, strategic relevance to national development and sensitivity to Philippine political context, culture, tradition and gender and development.

2. Technical Scientific Merit
Sound scientific basis to generate new knowledge or apply existing knowledge in an innovative manner.

3. Budget appropriateness
The proposed budget is commensurate to the proposed work plan and deliverables

4. Competence of Proponent
Proponent's expertise is relevant to the proposal and with proven competence to implement, manage and complete R&D programs/projects within the approved duration and budget

Other Factors
The Approving Authorities, the GC and/or EXECOM, based on the rankings and preliminary recommendation of the PMT, will make final funding decisions. The Approving Authorities may also consider programmatic priorities and geographic diversity of grants.

Contact

DOST-PCIEERD Project Managers are available to provide appropriate assistance to potential applicants interested in competing for this Call for Proposals. This may include assistance to potential applicants in determining eligibility of the applicant or the applicant's proposed project for funding, questions about administrative issues relating to the submission of a proposal, and clarifications on the announcement.

Contacts:
Emerging Technologies Sectors:
Ms. Edna C. Nacianceno**,** ecnacianceno@pcieerd.dost.gov.ph

Energy and Utilities Systems Sectors:
Ms. Rachel R. Habana , rrhabana@pcieerd.dost.gov.ph

Industry Sectors:

Ms. Mary Grace G. Buenavides, mgbuenavides2@pcieerd.dost.gov.ph

Science Communication Sector:
Ms. Allane M. Orendez, allane.orendez@pcieerd.dost.gov.ph

Special Concerns:
Environment: Ms. Mary Grace G. Buenavides
Creative Industry: Furniture, Jewelry : Ms. Mary Grace G. Buenavides
Creative Industry- Animation, Game, and Film: Ms. Edna C. Nacianceno;

Impact Assessment: Ms. Grace F. Estillore, gfestillore@pcieerd.dost.gov.ph

For **general or inquiries related to the Call Guidelines**, the applicant may contact:

Ms. Grace F. Estillore, Policy Coordination and Monitoring Division
gfestillore@pcieerd.dost.gov.ph
Ms. Carlota P. Sancho, Policy Coordination and Monitoring Division
cpsancho@pcieerd.dost.gov.ph

Additional information

PCIEERD Eligibility Criteria.pdf
Evaluation Criteria Emerging Tech I-24-0326-16 2 (3).pdf
PCIEERD Evaluation System PMT Score.pdf
PCIEERD Evaluation System TP Score.pdf
PCIEERD_GC_Scoresheet.pdf

List any supporting documents you will provide

References for PCIEERD-supported projects:
http://projects.pcieerd.dost.gov.ph/
https://pcieerd.dost.gov.ph/library/annual-reports
https://pcieerd.dost.gov.ph/supported-programs-projects/supported-programs-and-projects/on-going-projects

List any related content links

DOST MC 003 series of 2025 Guidelines for the Grants-in-Aid (GIA) Program of the Department of Science and Technology (DOST) and its Attached Agencies. DOST MC

003_DOST GIA Guidelines_Nov2025.pdf

AO 508 S. 2013 Hiring of Staff - Adoption of a Minimum Qualification Standard.pdf

DOST AO 958, series of 2024 DOST-GIA-Prescribed-Salary-Rates-Year-2024-2027_SO-958-.pdf

DOST Administrative Order (AO) No. 005.s.2025 Revised Rules on Personal Foreign Travel of DOST Personnel I-25-0925-30.pdf

I-24-0604-43 7Ps valuation (1).pdf I-25-1017-21 7 Ps (1).pdf

DOST Forms (downloadable versions from the DPMIS):
https://dpmis.dost.gov.ph/index.php/transparency/downloads/category/2-dost-forms

A.O. 014, S. of 2019 DOST M&E Protocol DOST_ME_Handbook_Body.pdf

Stakeholders Consultations Stakeholders' Consultation 2025.xlsx

TABLE OF CONTENTS

OVERVIEW **1**

CALL THEMES

I. Emerging Technology Development in the Philippines **3**

1.1. Advanced Materials and Nanotechnology Sector 3
1.1.1. Advanced Materials and Nanotechnology 3
1.1.2. Additive Manufacturing 4

1.2. Optics and Photonics, and Nuclear R&D Sector 6
1.2.1. Optics and Photonics, and Nuclear R&D Program 7

1.3. Artificial Intelligence (AI) Sector 8
1.3.1. AI Pinas: AI Enabling Solutions for Emerging Needs 8

1.4. Information and Communications Technology (ICT) Sector 11

1.5. Industry 4.0 12

1.6. Creative Industry Sector (Game, Animation, and Film Cluster) 14

1.7. Quantum Technology 16

1.8. Geospatial Technologies 18

II. Energy and Utilities Systems Technology **22**

2.1. Intelligent River and Water Management 22

2.2. Resilient and Smart Construction Solutions for Infrastructure Modernization 25

2.3. Transportation 28

III. Industrial Technology **32**

3.1. Food Sector 32
3.1.1. Food Innovation Program 34
3.1.2. DOST Integrated Food Safety Program 36
3.1.3. DOST Halal S&T Program 37

3.2. Process Sector 38
3.2.1. Natural Product Program 39
3.2.2. Chemical and Biological Manufacturing and Allied Industries Program 40
3.2.3. Textile Program 43
3.2.4. Agro-Industrial Program 45

3.3. Mining and Minerals Sector 47
3.3.1. Value-adding of Metallic Minerals Program 48
3.3.2. Value-Adding of Non-Metallic Minerals 58
3.3.3. Technologies in Support to Environmental Protection Conservation and Rehabilitation of Mined-out Area 69

3.4. Metals and Engineering Sector 73
3.4.1. Machining and Fabrication 73

3.5. Environment Sector 76
3.5.1. National Research and Development Program for the Prevention and Control of Water Pollution 77
3.5.2. National Research and Development Program for the Prevention and Control of Air Pollution 79
3.5.3. Innovative Solutions to Solid Waste Management 80
3.6. Creative Industry Sector 82
3.6.1. Footwear Program 84
3.6.2. Furniture Applications Program 85

IV. Science Communication 86
4.1. Science Communication for Innovation Program 87
Research Extension to Accelerate Communication
4.1.1. Development of Information & Dissemination Activities 87
4.1.2. Production of IEC Materials 88

V. Impact Assessment 93
VI. Science for Change Program (S4CP) 95

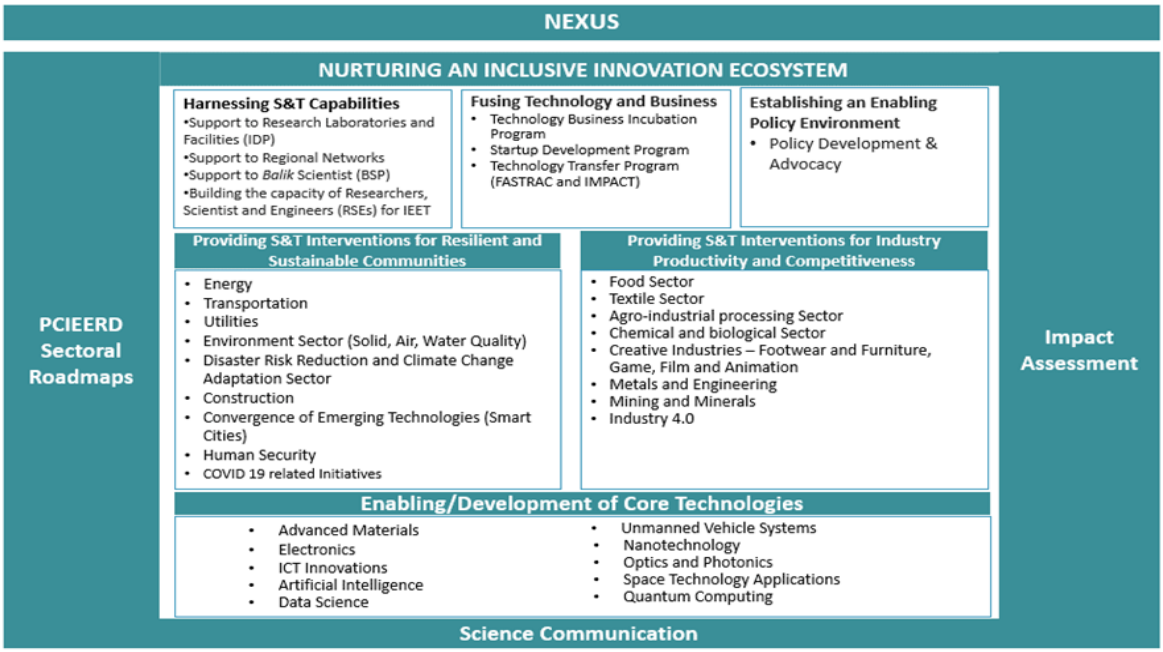
ANNEX A

2026 Call for Proposals for 2028 Funding

Overview

The Call for Proposals by DOST-PCIEERD is aligned with *AmBisyon Natin 2040,* from which the DOST Strategy Framework for 2023-2028 is derived. The priorities identified under the Three-Horizon STI Economic Strategy (2025-2028) are also integrated in the Call.

The Call also aligns with the Harmonized National R&D Agenda (HNRDA) for 2022-2028 as well as the PCIEERD's Roadmap and Action Plan (2021-2028) which is clustered into a program agenda called NEXUS or Nurturing Exemplars of Unified Scientific Solutions.



The NEXUS consists of three essential pillars, *i.e.*, Harnessing S&T Capabilities, Fusing Technologies and Business, and Establishing an Enabling Policy Environment. There are complementing components driven by S&T initiatives which contribute to the rationale and aspirations of the program. These are:

1. Providing S&T Interventions for Resilient and Sustainable Communities- This program provides for the development of scientific and technological interventions that contribute to resilient and sustainable communities by considering and addressing multiple human needs, reflecting the interdependence of economic, environmental, security and social issues.

2. Providing S&T Interventions for Industry Productivity and Competitiveness - This program provides for the development of scientific and technological interventions that contribute to the industries' productivity and competitive advantage

3. Enabling/Development of Core Technologies - To spur innovation and transformation in the country, PCIEERD provides support and S&T interventions for the development of enabling core technologies and solutions for the emerging industries, energy, and infrastructure sectors to solve the challenges of today and tomorrow. PCIEERD will continuously harness and develop new and emerging technologies on the horizon.

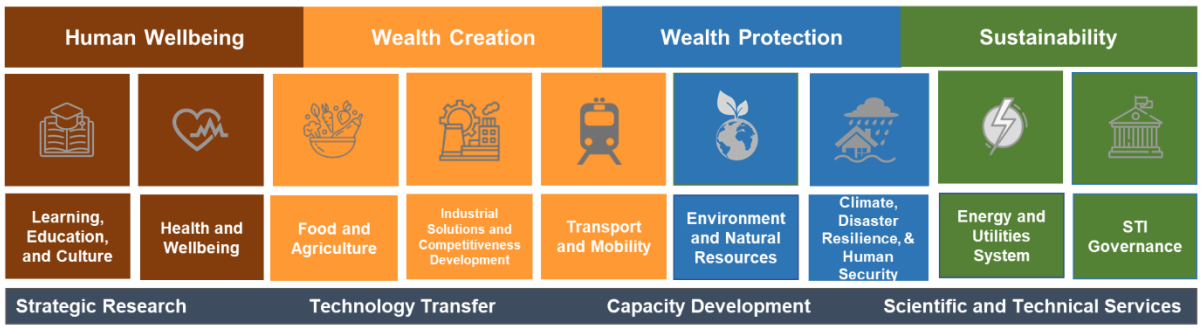
4. Science Communication for Innovation - Communication of scientific information with potential users and the public is an important aspect of science and technology. Only until results of science are communicated and shared accordingly will research be deemed complete. As Science Communication (Scicom) is a rapidly expanding discipline, having both practical and theoretical features that are critical to today's developmental challenges, PCIEERD provides support for undertakings towards an integrated, inclusive, and innovative approach of the said discipline in the country. Interventions and activities in communicating science will cut across the whole R&D process of PCIEERD-funded projects to include the relative pillar of science communication in accordance with its nature.

5. Impact Assessment- This program provides for the determination of the effectiveness and success of the significant investments made by the Council on research and development (R&D), information dissemination and technology transfer activities and initiatives, and assessing the significance of changes brought about by those activities. Impact assessment studies on PCIEERD-funded or monitored projects are conducted to determine and measure the changes, both intended and unintended, that result from research, development, and extension.

The 2026 Call also supports the 4 Pillars of DOST which goal is to strengthen and advance science, technology, and innovation (STI) in the Philippines, ensuring responsive, people-centered, and technology-enabled public services and governance. This year's R&D call prioritizes nine thematic areas under the DOST's 4 Pillars: Human Wellbeing, Wealth Creation, Wealth Protection, and Sustainability.

AMBISYON NATIN 2040

Matatag, Maginhawa, at Panatag na Buhay Para sa Lahat



For each of the DOST four pillars, DOST-PCIEERD intends to support R&D programs that will contribute to the attainment of the following:

- On Human Well-being - DOST PCIEERD will be supporting programs on food security, water security and environmental protection, energy security, and human resource development.
- For wealth creation - increase economic development, job creation, and industry competitiveness.
- For wealth protection - R&D programs on climate and disaster resilience will ensure that minimal resources are shielded from calamities.

- On sustainability - R&D programs will be geared towards facilities upgrading, digital transformation, and smart and sustainable communities.

Call Themes

I. Emerging Technology Development in the Philippines

The Call for Proposals on Emerging Technologies aims to strengthen and vigorously advance science, technology, and innovation (STI) in the Philippines, and ensure sustainable, responsive, people-centered, and technology-enabled public services and governance.

Stakeholder consultations with representatives from academia, research and development institutions (RDIs), government institutions, and private sectors, held in 2024 and 2025, updated the current roadmaps of the Emerging Technology Development Division (ETDD) and determined its priorities for funding in CY 2028.

Advanced Materials and Nanotechnology Sector

Call Rationale

Advanced materials are at the forefront of innovation, enabling breakthroughs in energy, semiconductors and electronics, and sustainable manufacturing applications, among others. These materials not only enhance the performance and functionality of existing technologies but also pave the way for entirely new applications. Research and Development (R&D) in Advanced Materials is a cornerstone of the Philippines' strategy to transition from a consumer of technology to a high-value producer. In late 2025, the significance of this field spans economic resilience, national security, and environmental sustainability. By investing in advanced materials, the Philippines is moving beyond its traditional role as a source of raw minerals and becoming a hub for "value-added" manufacturing. The Philippines, with its growing R&D ecosystem, is at an advantage in harnessing its capabilities in materials science to address both local and global challenges, such as energy sustainability and manufacturing resilience.

Call Objective

- Accelerate the development of emerging and advanced materials to address societal needs and economic opportunities.
- Promote sustainability by leveraging green synthesis methods, bio-inspired designs, and sustainable materials.
- Enhance local industries through the development of innovative applications in energy storage, flexible electronics, virology, and manufacturing.

Call Scope

R&D on the following areas shall be supported:

Advanced Materials and Nanotechnology (10 projects, P20 M each)

- Sensing Materials (carbon quantum dots, thermoelectric and thermoresistive materials, etc.)

- Materials for semiconductor and electronics applications (wide bandgap semiconductor, thermal management materials, materials for 5G and 6G applications, etc.)
- Packaging materials for virology applications
- Materials informatics towards energy applications
- Quantum materials and metamaterials for computing, sensing and energy applications (New materials enabling next-generation chips, sensors and energy-efficient computing, including quantum and topological materials and metamaterials for photonics, antennas and advanced devices)

Plasma R&D Program (NICER) (3 projects, P20M each)

- Optical Coating
- Energy Harvesting and storage
- Coating for automotive and aerospace

Specific Requirements

- Proposals must demonstrate strong scientific and technological merit and align with the funding priorities listed above.
- Collaboration between academic institutions, government agencies, and industry partners is highly encouraged.
- Projects should outline clear deliverables, timelines, and potential for commercialization or industry adoption.
- Ensure that the research output is planned out by submitting a clear technology commercialization pathway.

PCIEERD will fund project for a maximum of three (3)-year duration depending on the scope of work being proposed.

Additive Manufacturing

Call Rationale

Additive Manufacturing (AM), also known as 3D printing, is revolutionizing traditional production processes, enabling rapid prototyping, custom manufacturing, and resource-efficient fabrication. Since the establishment of the Advanced Manufacturing Center (AMCen) in DOST in 2021, the sector has transitioned from foundational to strategic expansion phase with the following milestones:

- Operationalization of the Fabrication and Prototyping Laboratory in MIRDC and Materials Development Laboratory in ITDI in 2021
- Conduct of the first Philippines Conference on Additive Manufacturing (PhilCAM) and stakeholder's forum in 2022
- Evolution into the Central Hub for Advanced Manufacturing R&D in the Philippines (CHAMP) Program in 2023, which resulted in notable development of feedstock and prototypes for manufacturing, medical, consumer goods, construction, and education sectors
- Establishment of 18 satellite laboratories in the regions
- Partnership with academic institutions, industry and private companies, and government agencies
- Conduct of roadmap updating and an Additive Manufacturing Conference-Workshop in 2024, co-organized by MIRDC, ITDI, and PCIEERD and was participated in by

researchers from the government, academe, industry, experts/ resource persons, among others
- Sending of six (6) researchers to the AI training in Additive Manufacturing in the United States under the mentorship of Dr. Rigoberto C. Advincula of the University of Tennessee, Knoxville
- Hosting of the following key events in 2025: AM Technical Working Groups Roadmapping, ISO/TC 261 – ASTM Joint Committee Meeting, and Asian Conference on Advanced Manufacturing

Moving forward to 2027, PCIEERD aims to leverage the established capabilities and facilities to address national concerns through high-impact and sustainable AM solutions. By fostering innovation in AM processes, materials, and applications, the program seeks to enhance the country's manufacturing capabilities, promote sustainability, and support socio-economic development in key sectors.

Call Objective

- To support R&D for innovative design and fabrication processes with increased Technology Readiness Levels
- To strengthen domestic supply by continuing the development of locally sourced sustainable materials and feedstocks, thus reducing import dependence
- To continue establishing national certification standards for AM
- To transition from prototyping to mass-production of solutions intended to address the needs of the manufacturing, consumer goods, and construction sectors using AM

Call Scope

Proposals to be submitted should develop technologies aligned with the call scope within two to three years, addressing one or more of the following priority areas:

- Manufacturing
    - Aerospace
        - Development of satellite components (TRL 4)
        - Development of courses on design for AM for industry personnel
        - Development of a lightweight monolithic cube satellite 2U frame (TRL 4)
    - Automotive
        - Development of fixtures for automotive quality assurance
        - Development of fixtures for automotive assembly
    - Defense
        - Development of localized/optimized firepower through the application of 3D printing
        - Conduct of national training needs assessment for AM in defense
        - Development of platforms, structures, materials, and products for unmanned systems
    - Semiconductor and Electronics
        - AM-enabled production of microelectronic components and packaging
        - Modality/techniques for adoption of 3D printed polymer/metal parts like tooling, spare parts, among others
- Consumer goods
    - Recycling and reformulation of 3D printing wastes (polymer, metal, ceramic, composites)

    - Development of 3D-printed membrane for desalination and energy generation and storage applications
    - Development of new AM feedstock with advanced functionalities and applications
- Construction
    - Material innovation
        - Development of materials database
        - Development of low-carbon and environment-adaptive 3D concrete panels
        - Development of mix formulations of locally sourced materials and waste as alternative green cementitious materials
        - Development of bio-based additive construction materials
        - Investigation of properties of fresh/wet materials before solidification, hardened materials, geometric conformity, and factors affected by applications
    - Design and structural optimization
        - Optimization of geometric design patterns in 3D printed reinforcement for enhanced load distribution
        - AI-driven real-time parameter optimization for 3DCP in tropical climate
        - Structural performance analysis of 3D printed load-bearing walls using different layering patterns and materials
        - Integration of 3D printed reinforcements in modular precast concrete elements for rapid construction

Specific Requirements:

- Proposals must demonstrate strong scientific and technological merit and align with the funding priorities listed above.
- Collaboration between academic institutions, government agencies, and industry partners is highly encouraged. To ensure that the research output will be utilized by the target industry/ adaptor, a letter of interest together with a three to five-year technology pathway must be submitted.
- Projects should outline clear deliverables, timelines, and potential for commercialization or industry adoption.
- Ensure that the research output is planned out by submitting a clear technology commercialization pathway.

PCIEERD will fund **six (6) projects** and shall fund **P20 Million** each project per year depending on the scope of work being proposed.

Optics and Photonics, and Nuclear R&D Sector

Call Rationale

Optics and Photonics are transformative technologies with wide-ranging applications in imaging, communications, laser science, and energy. They play a vital role in advancing industries such as defense, healthcare, telecommunications, and renewable energy. This program seeks to harness the potential of optics and photonics to address national priorities, foster innovation, and position the Philippines as a competitive player in global technology development.

Nuclear Science R&D offers unparalleled opportunities for advancements in materials science, industrial applications, and research. By developing facilities and R&D projects

focused on low-energy electron beams and neutron imaging, the program supports the establishment of foundational nuclear technologies for scientific, industrial, and societal benefits.

Call Objective

- Advance R&D in optics, photonics, and nuclear science to create high-value solutions for defense, communication, energy, and industrial applications.
- Establish state-of-the-art facilities to serve as national hubs for innovation and capacity building in Visayas and Luzon.
- Enhance local industries and promote sustainable development through cutting-edge research, technology development, and knowledge transfer.
- Foster international collaboration and increase the Philippines' visibility in global science and technology innovation.

Call Scope

Proposals to be submitted should develop technologies aligned with the call scope within 2-3 years.

Proposals to be submitted should be aligned to the indicators specified under the **Optics and Photonics R&D Roadmap** including the following priority topics:

- Optics and Photonics
  - Photonics-integrated circuits (PICs) (5G and 6G applications, etc.)
  - Terahertz R&D (advanced telecommunications, non-destructive testing for industry applications, etc.)
  - Imaging (non-destructive imaging, metrology, and structural imaging, etc.)

- Nuclear Science R & D
  - Neutron Imaging applications

Specific Requirements

- Proposals must demonstrate strong scientific and technological merit and align with the funding priorities listed above.
- Collaboration between academic institutions, government agencies, and industry partners is highly encouraged.
- Projects should outline clear deliverables, timelines, and potential for commercialization or industry adoption.
- Ensure that the research output is planned out by submitting a clear technology commercialization pathway.

Artificial Intelligence (AI) Sector
AI PINAS: AI Enabling Solutions for Emerging Needs

Call Rationale

Artificial Intelligence is a transformative force reshaping industries, enhancing government services, and addressing global challenges. With its rapid evolution, AI holds the potential to improve economic productivity, ensure national security, and advance the Philippines' technological standing.

From 2022-2025, some of the notable R&D Projects supported by DOST and DOST-PCIEERD are as follows:

- SpaceBetweenUs: A Computer Vision Application for Physical Distancing Monitoring in Public Areas
- AI Robotics for autonomous missions – Autonomous Societally Inspired Mission Oriented Vehicles (ASIMOV) Program (HAWKS and ROAMER)
- Philippine Sky Artificial Intelligence (SkAI-Pinas) Program
- AI for DRR and Infrastructure
- AI-TEWS: Development of an AI-assisted Thunderstorm Early Warning System from Analysis of Doppler Radar Data
- Intelligent Structural Health Monitoring via Mesh of Tremor Sensor
- Cost-effective Technology for Monitoring and Quantifying Benthic Area Covered by Marine Litter in Shallow Coastal Areas
- Development of a CNN and RNN Topology for Impedance Spectroscopy Analysis
- Unistar Automated Repossessed Motorcycle Assessment System
- Development of Multi-lingual Chatbot for Health Monitoring of Public-School Children
- Design and Development of Intelligent Traffic Control and Management System
- Diachronic Representation and Linguistic Study of Filipino Word Senses Across Social and Digital Media Contexts
- A Lightweight Edge Computer Vision Solution for Smart and Efficient Traffic Management
- Digital Reinforcement to Enable AI (Artificial Intelligence) to Maximize Solutions in BJMP Region X
- Development of a Meranaw Speech Corpus
- Nexus for Advanced Risk Reduction and Analytics System for PNP-COCPO
- COULIGLIG: Cooperative Unified Logistics using Intelligent Grouped Robots
- Advancing Computing, Analytics, Big Data and Artificial Intelligence in the Philippines (ACABAI-PH) Program.
- aiRack: AI-Driven Hybrid-Powered Smart Data Cabinet with Intelligent Thermal and Power Management for Sustainable IT Operations (approved for 2025 funding)
- DepthSeek: Development of an Autonomous Underwater Vehicle with Vision-guided Navigation and Acoustic Communication (approved for 2025 funding)

In terms of facilities and services, AI data centers with high-performance computing (HPC) capabilities were established in selected higher education institutions (HEIs), namely CarSU, DLSU, UP Diliman, UP Los Baños, UP Mindanao, DOST-ASTI, USTP, and MSU-Naawan. The completed SkAI-Pinas Program developed an open data-sharing platform and AI R&D infrastructure, which now serves as the foundational platform for further enhancements under the ACABAI-PH Program.

On the science and technology (S&T) policy front, a Memorandum of Understanding (MOU) between the Department of Science and Technology (DOST) and the Bangko Sentral ng Pilipinas for the *"Banking Through Responsible and Innovative Technology (BRITE) Program"* was approved and signed by both parties in 2025.

In terms of capacity building, DOST supported various initiatives beyond the series of trainings conducted in previous years. These included PCIEERD's Online Training on Multi-Tasking AI for ASEAN Member States in 2022 and the First AI PINAS R&D Conference–Workshop held in March 2023. The conference-workshop served as a venue for researchers from higher education institutions and R&D institutions, as well as representatives from government, private, and public sectors, to share AI R&D initiatives, review the AI roadmap, and develop R&D proposals for potential funding. In February 2025, ten (10) participants selected by DOST-PCIEERD attended the UK–Alan Turing Institute AI Governance Workshop, which aimed to strengthen the Philippines' capacity to govern artificial intelligence through a tailored

knowledge and capacity-building program for senior stakeholders from government, academia, and industry. As a follow-up, the Open Data Institute (ODI) Workshop on Data-Centric AI Governance with DOST was conducted in March 2025 to introduce key concepts in data ecosystems, data-centric AI, and ecosystem mapping, with the objective of strengthening data governance and AI development in the Philippines.

In May 2025, the Philippines formally approved the National Artificial Intelligence Strategy (NAIS-PH), providing a roadmap for a whole-of-nation approach to harnessing AI for inclusive innovation, improved governance, community upliftment, and the development of globally competitive industries. Following the approval of the NAIS-PH Framework, DOST, together with DOST-PCIEERD, conducted the First National AI Stakeholders' Conference in October 2025, themed *"NAIS-PH in Motion: Shaping the Future of an AI-Powered Philippines"*. The conference aimed to generate actionable recommendations for the effective implementation of the NAIS-PH.

This call emphasizes:

- Development of AI solutions tailored to local contexts and challenges, including government operations, banking, and cybersecurity among others;
- Exploration of advanced AI platforms and their transformative potential in areas such as generative AI, federated AI, and swarm intelligence;
- Strengthening the integration of AI into robotics and advanced language models to broaden their applications, particularly for underrepresented and endangered Philippine languages; and
- Advancing the country's technological capabilities, enhancing public services, and supporting innovation-driven growth through sustained AI R&D in alignment with the NAIS-PH.

Objectives

- Advance machine learning and AI solutions to address critical needs in government, finance, and cybersecurity, among others.
- Explore emerging AI platforms to develop transformative applications and enhance the Philippines' R&D capacity.
- Enhance large language models (LLMs) to preserve Philippine languages, improve multilingual capabilities, and enable the development of specialized AI applications.
- Strengthen cybersecurity resilience through AI-driven threat detection, prevention, and automated response mechanisms.
- Build national expertise and robust infrastructure to support widespread AI adoption and innovation.

Scope

Proposed projects must develop technologies on the following priority areas with specific applications that will help address pressing national problems.

The proposal should support applications on the following topics:

1. AI Discovery Grants Program
Maximum Budget Allocation: Php 5M per proposal
Target Number of Project/s to be Funded: 10

The AI Discovery Grants Program supports early-stage and exploratory research and development (R&D) initiatives in the field of Artificial Intelligence (AI). It is designed to fund

proof-of-concept studies and academic research that investigate innovative AI methods, frameworks, and applications. Eligible projects may involve the development of AI models, algorithms, or prototype systems that demonstrate technical feasibility, address local or sector-specific challenges, or contribute to foundational AI knowledge. Proposals should clearly articulate their potential for future implementation, scaling, or integration into broader digital ecosystems. Priority R&D focus areas include, but are not limited to, the following:

- Public Sector & National Development
- Industry & Emerging Technologies
- Data, Trust & Governance
- Cross-Cutting / Enabling AI platforms
- Cybersecurity
- Finance
- Creative Industries
- Education Technology

2. Beyond Words: Advancing Large Language Models (Directed)
Maximum Budget Allocation: Php 30M per program proposal
Target Number of Project/s to be Funded: 2-3 component projects

Development and application of Large Language Models (LLMs) with a focus on:

- Corpus and LLM Platform for KWF-Targeted Languages to build datasets and models for Philippine languages.
- Enhancing LLMs' Abilities for Underrepresented or Endangered Languages to preserve cultural heritage and linguistic diversity.
- Building Stronger Cross-Lingual and Multilingual Capabilities to improve LLMs' ability to operate in diverse linguistic environments.
- Applications of LLMs in Specialized Domains to develop solutions for education, healthcare, and other sectors.

Specific Requirements

To ensure that the research output will be utilized by the target industry or local regulatory agency, a letter of support / commitment / collaboration must be secured. The proponent should be able to secure training data sets from the target partner institution.

For the LLM, the identified proponents must have answered the survey, attended the Focus Group Discussion (FGD) conducted by DOST-PCIEERD, and demonstrated active participation in these initiatives.

Information and Communications Technology (ICT) Innovation

Call Rationale

Information and communication technologies (ICT) are key enablers of innovation and encompass a broader array of activities. The overall strategies outlined in this roadmap are fundamentals in attaining the Networked Society. The key technology trends or R&D solutions that will stimulate innovations within the ICT industry in the coming years will create new value streams for consumers, government, industry and society. A technology-enabled ecosystem is made possible through a universal, horizontal and multipurpose communications platform. The R&D technologies in ICT Innovations is combined with the next generation of networks

such as 5G provide support to IoT, creation of cyber driver dynamic content, retrieval and analysis, among other applications.

From 2021 – 2025, DOST and the council supported ICT Innovation projects such as:

- i-Drip (IoT-Based Dispenser for Real-time Intelligent Pour) an IoT-Based Real-Time Control and Monitoring System for Smart Beverage Dispenser) in 2021.
- Stabilization and Strengthening of Network Infrastructure to Support the DOST Information System (DOST IS)
- Development and Operationalization of the DOST Geospatial Analytics and Technology Solutions (GATES) Program
- AgilaCom: A Multi-Communications Integrated System (approved for 2025 funding)

In terms of facilities and services, the ongoing GATES Program aims to enable the DOST to fully utilize the vast geospatial data generated by its agencies and harness these resources through advanced technologies—such as Artificial Intelligence (AI) and machine learning applications, business intelligence and predictive analysis – for data-driven decision making, towards the achievement of the DOST Strategic Plan 2023-2028 Outcome Pillars.

Call Objective

The main objective of this call is to support research and development projects for ICT innovations, specifically to:

- Strengthen national ICT capabilities through advanced R&D in computing, connectivity, and cybersecurity.
- Enhance data sovereignty and management by developing localized cloud computing and archiving solutions.
- Innovate connectivity solutions to address challenges in wave spectrum utilization and communication efficiency, particularly with 5G and emerging technologies.
- Enable local and global competitiveness by supporting projects that address strategic national ICT priorities.

Proposals shall address the needs and strengthen the capabilities of the local industry in terms of facilities and services, human resources, R&D technologies, and/or S&T policies.

Call Scope

This call targets to support applied research projects on the following topics:

1. Next-Generation Connectivity and Communication Technologies
Maximum Budget Allocation: Php 20M per proposal
Target Number of Project/s to be Funded: 2

This call focuses on advancing innovative communication systems that redefine connectivity through enhanced resilience, scalability, and adaptability. It targets emerging technologies such as 5G and 6G networks, swarm communications, software-defined radio, and cognitive networking to address critical challenges including spectrum scarcity, disaster response and recovery, and digital inclusion. The objective is to develop future-ready communication solutions that support smart cities, underserved and rural communities, and critical infrastructure, ensuring secure, reliable, and efficient connectivity in an increasingly complex and dynamic digital landscape.

Specific Requirements

To ensure that the research output will be utilized by the target industry or local regulatory agency, a letter of support / commitment / collaboration must be secured. The proponent should be able to secure training data sets from the target partner institution.

Industry 4.0

Call Rationale

The Fourth Industrial Revolution, or Industry 4.0, is transforming industries through the integration of advanced technologies such as the Internet of Things (IoT), artificial intelligence (AI), and cyber-physical systems. For the Philippines, embracing Industry 4.0 presents an opportunity to boost competitiveness, foster innovation, and ensure sustainable industrial growth.

The Council has supported the establishment of advanced mechatronics, robotics, and automation laboratory or AMERIAL in 2018. However, such facility must be maintained, sustained, and even expanded to accommodate beyond the training program that it can offer.

Bulk of the efforts so far were focused on capability building. The Council has been part of the industry 4.0 Technical Working Group (TWG) as organized by the Semiconductor and Electronics Industries in the Philippines Foundation Inc. (SEIPI) where series of industry-led webinars were already held for Industry 4.0 awareness and adoption. Also, through the established TWG, local standards were developed to assess the smart industry readiness and smart manufacturing maturity of industrial companies with initial focus on electronics industry.

As for the R&D technologies, the Council has already supported a project on the development of non-intrusive sensor-based prescriptive maintenance platform particularly for wire manufacturing on anomaly detection for wire extruders. DOST likewise supported new R&D projects on Digital Manufacturing Assembly Trainer (DMAT) and the Digital Twin Simulator (DTS), a modeling and simulation of a digital predictive twin and CUATRO (IR 4.o) Program of DOST-MIRDC. It is the vision of this sector to create and foster a flourishing innovation ecosystem for Industry 4.0 in the country.

Finally, for S&T policy, in collaboration with DTI and SEIPI, initiatives were already made in providing incentive systems for Industry 4.0 readiness assessment and certification. Curriculum changes and formulation of cybersecurity protocols will be explored in the coming years to increase responsiveness with the rapid pace of innovation in smart manufacturing.

However, challenges such as limited adoption of predictive maintenance systems, a lack of tailored digital transformation models for key industries, and the need for smarter production systems must be addressed. Developing solutions in these areas will enhance operational efficiency, reduce downtime, and enable data-driven decision-making.

This call focuses on developing degradation and predictive maintenance systems, digital transformation models for the electronics industry, cyber-physical production systems, and collaborative diagnostics and decision-making tools, aligning with the country's goals for industrial modernization and global competitiveness.

Call Objectives

- Advance applied R&D in industrial automation and analytics that address real-world industry needs and challenges;
- Develop intelligent, data-driven solutions that improve operational efficiency, quality control, predictive maintenance, and decision-making;

- Strengthen the integration of AI, IoT, robotics, and analytics in industrial environments;
- Support technology adoption and innovation among Philippine industries, particularly SMEs;
- Contribute to national priorities on digital transformation, innovation, and inclusive industrial growth;
- Support industry competitiveness by equipping local companies with the tools to transition toward Industry 4.0 standards.

Call Scope

This call intends to solicit proposals on the integration of intelligent sensor networks, coupled with AI, to improve existing systems and/or develop new services and breakthroughs in science as applied to Intelligent Factories. To adopt the elements of the Industry 4.0 architecture, the Council will prioritize projects in the following fields:

1. Next-Generation Industrial Automation and Analytics
Maximum Budget Allocation: Php 15M per proposal
Target Number of Project/s to be Funded: 2

This call prioritizes innovative solutions that integrate automation, data analytics, Internet of Things (IoT), and artificial intelligence (AI) into physical production systems to enable smart, adaptive, and efficient manufacturing environments. Proposed projects should address key challenges faced by local industries, including productivity improvement, resource optimization, and sustainability, while promoting the adoption of Industry 4.0 technologies, particularly among small and medium enterprises (SMEs). Key focus areas include, but are not limited to, the following:

- Real-Time Monitoring and Control: Development of systems that deliver predictive insights and enable dynamic, data-driven adjustments in production processes.
- Intelligent Production Networks: Integration of smart machines, sensors, and IoT platforms to support seamless data exchange, interoperability, and automated decision-making.
- Sustainable Manufacturing Systems: Design and deployment of cyber-physical production systems (CPPS) that optimize energy consumption, minimize waste, and support environmentally responsible manufacturing practices.

Specific Requirement

Proposed projects must demonstrate the potential for wide-scale adoption, significant economic impact, and alignment with national priorities for industrial innovation and competitiveness. Proposals should include a letter of support from the target beneficiaries or intended adopters to ensure sustainability and relevance. Additionally, a Technology Roadmap outlining the development, deployment, and scaling of the proposed solution must be provided.

Creative Industry Sector (Game, Animation, and Film Cluster)

Call Rationale

Creative Industry is considered as one of the growing sectors in the global economy which contributes significantly to Gross Domestic Product (GDP) of developed countries. The Philippines is among the developing countries with rich cultural heritage and pool of creative

talents that can potentially boost the economy through its creative goods. The country has the potential to be a creative hub in Asia through developing different creative industries including game, animation, and film.

The overall assessment of the existing roadmap highlights significant progress in facilities, human resources, R&D technologies, and S&T policies. Accomplishments include the establishment of extended reality (XR) facilities, and training 17 students and 240 personnel in game design and development. Additionally, the council supported the development of the Philippine Skills Framework for Game Development and Digital Art and Animation.

In terms of R&D, the focus has been on creating serious games for education, developing game engines, proprietary software for CAD and 3D visualization, and hardware such as the *SandPix* sand printer. Other ongoing projects include immersive XR crime scene simulations, cultural heritage preservation through digitization, and use of 3D modeling in biodiversity information.

Moving forward, relevant activities will be conducted with key stakeholders such as the Game Developers Association of the Philippines, Esports World Federation, and other relevant organizations, alongside hosting a Creative Industry Summit to strengthen the sector's development.

Call Objective

The main objective of this call is to accelerate the development of culturally grounded and workplace-oriented metaverse platforms through applied research and development. The initiative aims to:

- Enable immersive digital platforms that support cultural preservation, creative expression, and community engagement.
- Enhance workplace collaboration, training, and productivity through human-centered and inclusive virtual environments.
- Strengthen local R&D capabilities in metaverse technologies and position the Philippines as a regional leader in culturally relevant and future-ready digital workplaces.

Call Scope

This call targets to support applied research projects on one of more of the following priority areas:

1. Developing Metaverse Platforms for Culture and Workplace Applications
Maximum Budget Allocation: Php 15M per proposal
Target Number of Project/s to be Funded: 2 (PCIEERD-GIA)

The Metaverse is emerging as a transformative digital ecosystem that integrates extended reality (XR), artificial intelligence (AI), blockchain, and immersive collaboration tools to redefine how people interact, work, and preserve culture. Globally, metaverse platforms are increasingly adopted for virtual workplaces, cultural engagement, education, and creative collaboration, contributing to productivity growth and digital economic expansion. Key focus areas include, but are not limited to, the following:

- Immersive cultural spaces for museums, heritage sites, festivals, and indigenous knowledge systems

- Virtual workplace environments that support collaboration, onboarding, skills development, and organizational simulations, particularly for distributed and hybrid work settings, which may include blockchain-based identity verification, role management, and credential recognition

Specific Requirements:

Proposals must demonstrate the following:

- Innovation: A clear contribution to advancing creative technologies or processes.
- Applicability: Alignment with the needs of the Philippine creative industries, including scalability for adoption by local stakeholders.
- Sustainability: Adoption of environmentally conscious practices and long-term viability.
- To ensure that the research output will be utilized by the target industry or local regulatory agency, a letter of support / commitment / collaboration must be secured.

Quantum Technology

Call Rationale

Quantum technologies represent a new paradigm with transformative applications for digital economies and society (OECD 2025). As a cutting-edge field reshaping multiple sectors, quantum technology is attracting billions in global investment from leading economies such as the US, China, the European Union, and Australia. To remain competitive, it is crucial for the Philippines to develop capabilities in quantum technologies and build national technology capacity.

The Harmonized National R&D Agenda (HNRDA) 2022–2028 identifies quantum technology as a priority under emerging technologies. The DOST emphasizes that advancing R&D in innovative sectors is vital for sustainable growth and global competitiveness. The DOST identifies flagship R&D programs, including quantum computing, which are designed to address strategic national priorities while fostering innovation and technological advancement.

Call Objective

This call aims to fund R&D projects that generate new scientific knowledge to advance the global development of quantum technologies while simultaneously building a critical mass of local expertise. Funded initiatives must contribute to national innovation and the public good. The outputs produced by these projects are intended to support applications that will be developed in the future, such as, but not limited to, secure communication, precise measurement, and quantum computation. These future applications are expected to provide significant benefits by strengthening the country's long-term capabilities in sectors including energy, health, defense, and information technology, as well as other areas that may benefit from advances in quantum technologies.

Call Scope

The call is looking for proposals that will work on the following key research areas:

1. Quantum Computing

Research on quantum algorithms, quantum error correction and mitigation, quantum complexity theory, and emerging quantum hardware models including photonic, superconducting, spin based, NV centers in diamond, and memristive platforms. Includes the development of quantum programming languages, compiler infrastructures, simulation back-ends, and hybrid classical quantum workflows for materials modeling, chemical design, optimization, and other computational tasks. It also encompasses quantum machine learning, covering variational circuits, quantum neural networks, hybrid architectures, and performance benchmarking on existing devices and simulators.

2. Quantum Information Science (Foundations, Theory & Testbeds)

Fundamental studies of quantum states, entanglement, coherence, decoherence, resource theories, entropy, and quantum channels. Includes investigations of open and unstable quantum systems, quantum thermodynamics, quantum speed limits, and information-theoretic aspects of physical processes. Also covers foundational quantum testbeds—small-scale photonic or tabletop systems demonstrating Bell inequalities, Hong–Ou–Mandel interference, antibunching, and entanglement generation—together with integrated photonics, single-photon sources, and university-level capability building in experimental quantum information.

3. Quantum Secure Communication & Cryptography

Research on quantum key distribution (QKD), entanglement-based communication protocols, teleportation-assisted key exchange, and quantum-secure authentication and signature schemes. Includes post-quantum cryptography, hybrid classical–quantum security architectures, and experimental communication testbeds. Also encompasses real-time QKD over fiber or microsatellite links, noise analysis of simulated and hardware-based quantum measurements, and the development of rigorous security proofs and performance standards for deployable quantum communication systems.

4. Quantum Sensing & Metrology

Design and implementation of quantum-enhanced sensors using coherence, entanglement, squeezed states, quantum noise suppression, and solid-state defects such as NV centers in diamond. Target applications include geophysical monitoring, biomedical diagnostics, navigation, environmental sensing, materials characterization, and precision timing. Research spans theoretical modeling, device fabrication, system-level integration, and performance benchmarking to realize next-generation quantum-enabled measurement technologies.

5. Quantum Simulation

Theoretical and experimental simulation of quantum materials, molecular processes, chemical reactions, strongly correlated phases, and energy systems using controllable quantum platforms or quantum algorithms. Includes Hamiltonian engineering, analog quantum simulation in photonic or tabletop systems, variational simulation methods, and studies of quantum many-body dynamics such as correlated phases, transport, thermalization, and emergent collective behavior. Emphasis is placed on simulation fidelity, scalability, and domain-specific validation across scientific and technological applications.

6. Quantum Engineering & Enabling Technologies

Research and development of the classical and engineering subsystems that make quantum devices operable, stable, and scalable. This includes low-noise control electronics (e.g., FPGAs, ASICS, RF/microwave sources), cryogenic refrigeration technologies, high-vacuum

and high-pressure environments, precision timing and synchronization systems, photonics interfaces, and advanced packaging/integration of quantum chips. These engineering foundations are essential for building prototypes, characterizing qubit platforms, and enabling reliable quantum experiments and testbeds.

Specific Requirements: DOST / DOST-PCIEERD will fund 5-7 projects with a budget of 5-25 million per project depending on the scope of work being proposed. A clear technology pathway/roadmap must be submitted.

References:

OECD, 2025) *A Quantum Technologies Policy Primer*, OECD Digital Economy Papers, No. 371, OECD Publishing, Paris, https://doi.org/10.1787/fd1153c3-en

Department of Science and Technology -Office of the Undersecretary for R&D: High Impact R&D Programs

Draft White Paper: Output of the Quantum Science and Technology Roadmapping Pre-Conference workshop.

Geospatial Technologies

Call Rationale

Next-generation geomatics and geospatial technologies refer to the convergence of advanced sensing, high-precision positioning and timing, Earth observation, in-situ monitoring, real-time data fusion, intelligent analytics, and enabling digital infrastructure that transform geospatial systems from static mapping into accurate, resilient, and decision-ready spatial intelligence for smart cities, environmental monitoring, disaster resilience, and digital public services.

These technologies are now rapidly becoming indispensable to national development, enabling evidence-based planning, resilient infrastructure, efficient public services, and informed decision-making across government and industry. As the Philippines advances toward smart cities, digital governance, and data-driven development, the demand for accurate, timely, and interoperable geospatial information continues to grow—particularly for disaster risk reduction and management (DRRM), environmental monitoring, land and coastal management, transportation, and urban systems.

A critical but underdeveloped foundation of this transition is Positioning, Navigation, and Timing (PNT). PNT capabilities underpin surveying and mapping, geodetic monitoring, Earth observation (EO) ground operations, telecommunications, logistics, and emerging autonomous and intelligent systems. However, PNT-focused research and development remains limited in the Philippines, and many operational requirements depend heavily on foreign GNSS constellations and commercially available solutions. While these services are essential, this dependence may introduce vulnerabilities related to availability, continuity, resilience, and long-term strategic autonomy—especially as geospatial systems become more integrated into critical public services.

Strengthening local capacity in PNT-related research—particularly in ground-based augmentation concepts, timing and synchronization methods, and system interoperability—offers a practical pathway to improve positioning accuracy, enhance temporal consistency, and increase the reliability of geospatial workflows. When integrated with EO data and Internet of Things (IoT) sensor networks, enhanced PNT and synchronization capabilities can enable real-time, time-aligned environmental intelligence: improved sensor fusion, more reliable early warning systems, better situational awareness for LGUs, and stronger analytics for climate adaptation, resource management, and urban operations.

This Call aims to accelerate national R&D toward locally adaptable, pilot-scale, and scientifically validated next-generation geomatics solutions. It will support method development, prototype integration, and research-scale validation in areas such as timing and synchronization, GNSS augmentation concepts, EO–IoT data fusion, and geospatial intelligence workflows—anchored on rigorous error characterization, interoperability, and practical use cases. The initiative complements the Philippine Space Agency's (PhilSA) space-based efforts and aligns with DOST-PCIEERD priorities in emerging technologies, geoinformatics, and digital transformation, while expanding the country's scientific and technical capability to build resilient, scalable, and future-ready geospatial systems.

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Call Objectives

This Call aims to strengthen the country's geomatics capability by developing innovative, locally adaptable systems in positioning enhancement, spatiotemporal data integration, and precision timing to improve geospatial accuracy, environmental intelligence, and operational decision-making. Specifically, it seeks to:

1. Develop and pilot ground-based PNT reference and positioning enhancement systems that improve geolocation accuracy, data reliability, and calibration of EO and geospatial datasets, laying the groundwork for a scalable Philippine positioning enhancement framework.
2. Design, adapt, and demonstrate practical timing and synchronization solutions—including the evaluation and integration of compact precision timing devices and GNSS-based timing methods—to enhance temporal accuracy, interoperability, and resilience of geospatial, EO, and sensor network applications.
3. Integrate IoT environmental sensor networks with EO data through robust spatiotemporal fusion methods that use realistic synchronization and alignment approaches to generate timely, localized geospatial information for smart cities, disaster risk reduction, environmental monitoring, and infrastructure management.
4. Enhance local R&D competence and inter-agency collaboration in advanced geomatics, timing, and data fusion technologies, contributing to national goals in digital transformation, sustainable development, and evidence-based, data-driven governance.

Call Scope

Proposals to be submitted should be aligned with the *Next-gen Geomatics: Innovative Solutions* Roadmap and must fall within the following priority topics:

1. Development of Ground-Based PNT Reference and Augmentation Systems (1 project / Php 10-15 M)

This topic aims to support exploratory and pilot-scale research on localized approaches for enhancing GNSS-based positioning accuracy and reliability for geospatial applications such as surveying, mapping, Earth observation, and environmental monitoring. Proposals should focus on research-driven system design, algorithm development, and prototype integration rather than nationwide operational deployment.

Proposals may include the development and testing of localized GNSS augmentation concepts, algorithmic refinement of positioning corrections, and research-scale integration of prototype PNT reference nodes with selected existing geodetic or EO ground infrastructure. The objective is to generate validated methods, prototype components, and technical evidence that can inform future positioning enhancement initiatives and support the evolving needs of agencies such as PHIVOLCS, PAGASA, NAMRIA, and other institutions that rely on precise EO and geodetic data.

Scope may include:

- Design, development, and testing of localized GNSS augmentation approaches, such as differential correction modules or Precise Point Positioning / Differential Global Navigation Satellite System (PPP/DGNSS) enhancement algorithms, using publicly available datasets and limited prototype observations.
- Algorithmic testing and performance evaluation of PPP and DGNSS refinement models using selected regional GNSS reference stations on a research-scale basis.
- Pilot-scale integration and interoperability assessment of prototype PNT reference or observation nodes with existing GNSS CORS stations or EO ground-based facilities for scientific validation and feasibility analysis.
- Exploratory assessment of correction data dissemination mechanisms (e.g., IoT-based links, radio, mesh networks, or cellular infrastructure) to support limited field pilots and experimental validation of GNSS augmentation methods.

2. Timing and Synchronization Technologies for Geospatial and Environmental Systems (1 project / Php 10 M)

This topic aims to support research on the evaluation, adaptation, and prototype-level integration of compact timing devices and synchronization methods to improve the temporal accuracy and consistency of geospatial and environmental systems. Rather than the development of new atomic clock hardware, proposals should focus on the local adaptation, testing, calibration, and research-scale integration of commercially available timing technologies.

Improved timing and synchronization capabilities are expected to enhance interoperability among distributed sensor networks, synchronization of EO ground-based systems, and temporal consistency in geodetic and environmental monitoring workflows.

Scope may include:

- Evaluation and adaptation of compact precision timing devices (e.g., chip-scale atomic clocks, GNSS-disciplined oscillators, rubidium oscillators) for geospatial, Earth observation, or IoT-based sensing applications.
- Experimental or simulation-based demonstration of selected time-transfer techniques (e.g., GNSS-based, RF-based, optical, or short-range fiber-based) between limited ground stations, research facilities, or distributed sensor nodes.
- Development and evaluation of synchronization strategies for EO calibration activities, geodetic data processing workflows, or multi-sensor environmental monitoring, with

emphasis on method development, timing error characterization, and research-scale validation.

3. Integration of IoT Sensor Networks with Earth Observation Data (2 projects/Php 5-10 M per project)

This topic supports research on the integration of ground-based IoT sensor networks with Earth observation (EO) data to generate more accurate, localized, and timely environmental intelligence for hazard monitoring, forecasting, and smart city applications. Projects under this topic will emphasize PNT-enabled data integration, where positioning and timing information are used as enabling elements for sensor alignment, data consistency, and multi-source fusion, rather than as the primary technology focus.

The focus is on developing data-fusion methods, spatiotemporal alignment frameworks, and prototype decision-support tools that allow LGUs and national agencies to derive actionable insights from combined satellite and in-situ observations. Projects may adopt practical and locally appropriate timing and positioning approaches—such as GNSS-based timestamps, network time protocols (NTP), or local time servers—to ensure temporal coherence across distributed sensor systems in research-scale environments.

Scope may include:

- Integration of IoT sensor networks (e.g., rainfall, water level, air quality, temperature) with EO datasets for environmental monitoring, risk assessment, and early warning applications, including the development of prototype decision-support or visualization platforms for LGUs, DRRM offices, and environmental agencies.
- Development and testing of data-fusion algorithms or spatiotemporal alignment methods that harmonize satellite imagery and ground-based sensor observations, with attention to positioning accuracy, timing consistency, and data interoperability rather than operational deployment.

Specific Requirements

- Proposals must demonstrate strong scientific and technological merit, align with the funding priorities listed above.
- Proposals are expected to target TRL 3–5. At a minimum, proposals should advance technologies to TRL 4 (technology validated in a laboratory or controlled test environment). Projects may optionally validate selected components at TRL 5 (validation in a relevant field environment), subject to project scope and site accessibility.
- Projects should clearly define the scale of implementation (e.g., simulation study, prototype development, pilot testbed) appropriate to a 2–3 year R&D timeline.
- Collaboration among academic institutions, government agencies, and industry partners is highly encouraged.
- Projects should present clear deliverables, realistic timelines, and potential pathways for commercialization or industry adoption.
- Proponents must include a technology commercialization pathway and sustainability plan, identifying potential end users and outlining mechanisms for scale-up or transitioning outputs to end users.

II. Energy and Utilities Systems Technology

Intelligent River and Water Management

Call Rationale

The Philippines faces increasing water management challenges due to climate change, rapid urbanization, and aging infrastructure. Extreme weather events such as typhoons, floods, and droughts disrupt river systems, sediment balance, and water availability. Smart and science-based approaches are essential to monitor river dynamics, manage sediment, and forecast water-related hazards. This program emphasizes integrated solutions for sustainable river and water management, leveraging technology for real-time monitoring, predictive analytics, and adaptive interventions.

From 2026 to 2028, the water situation in the Philippines is expected to become more critical, exacerbated by climate change, rapid population growth, and aging infrastructure. According to the World Resources Institute's Aqueduct Water Risk Atlas (2023), water stress is projected to worsen, particularly in urban areas like Metro Manila and Cebu, where rising water demand is compounded by limited supply. The Philippine Statistics Authority (2020 Census) shows a growing population, further increasing pressure on water resources. The National Water Resources Board (NWRB) reports that current water infrastructure—such as dams and irrigation systems—struggles to meet demand, particularly in Mindanao and Luzon, where water availability is increasingly erratic.

Climate change further exacerbates these challenges, with PAGASA forecasting disruptions in rainfall patterns due to El Niño and La Niña phenomena. Prolonged El Niño events lead to lower streamflow, reduced water supply for agriculture and hydropower, and dam drying. Conversely, La Niña events cause flooding, water quality deterioration, and contamination of water supplies. These fluctuations not only affect irrigation but also impede aquifer recharge, crucial for long-term water sustainability.

To address these mounting challenges, the Department of Environment and Natural Resources (DENR) has implemented the Integrated Water Resource Management (IWRM) framework, aiming to optimize water use while enhancing resilience to climate change. The National Irrigation Administration (NIA) advocates for the modernization of irrigation infrastructure to improve efficiency and water management in agriculture. Additionally, the Philippine Climate Change Commission, through its National Climate Change Action Plan (NCCAP) (2021), promotes integrating climate adaptation strategies into water management. These strategies include improving water storage, upgrading flood control, and investing in water conservation technologies.

The Philippine Water Supply and Sanitation Master Plan (2020), developed by the National Economic and Development Authority (NEDA), provides a comprehensive framework for improving water access and infrastructure. It sets ambitious goals, including achieving universal access to potable water and sanitation services by 2030, aligning with the Sustainable Development Goals (SDGs). The plan also emphasizes integrated water quality management and infrastructure development to ensure that water systems are resilient to climate impacts, population growth, and environmental degradation.

Despite these efforts, without significant investment and reform, the Philippines is at risk of facing a severe water crisis by 2026-2028. The crisis will impact domestic water supply,

agriculture, and hydropower generation, and will exacerbate challenges related to water quality and aquifer recharge. Integrated management and a focus on long-term climate adaptation and infrastructure development are crucial to ensuring a sustainable water future for the country.

Call Objective

The objective of this call is to develop and implement intelligent, science-based solutions for river and water management. Projects should focus on flood monitoring, sediment management, river geomorphology, and water sustainability through advanced technologies and forecasting tools. Efforts must align with national frameworks such as the Integrated Water Resource Management (DENR), NCCAP (Climate Change Commission), and the Philippine Water Supply and Sanitation Master Plan (NEDA). References: World Resources Institute Aqueduct Water Risk Atlas, PSA 2020 Census, NWRB, PAGASA, DENR, Climate Change Commission, and NEDA.

The objective of this call is to provide scientific and technological (S&T) interventions that have not yet been applied locally, aimed at improving the effective management of water resources. This includes the development and deployment of innovative scientific tools, methodologies, and technologies to ensure a safe, reliable, and sustainable water supply

Call Scope
The R&D initiatives should address/cover the following identified research areas :

1. Smart River Systems (Monitoring and Management) - focused on flood monitoring, sediment management, and river geomorphology *(Maximum of One Project with a maximum total funding of Php 15,000,000.00)*

   This research area supports the development and deployment of advanced river monitoring and management technologies that deliver real-time data on hydrological variables such as streamflow, water levels, and sediment transport. Current initiatives such as the Integrated Water Resources Management Information System (IWRMIS) being implemented by the NWRB, which uses multi-sensor networks across river basins to support decision-making, demonstrate how technology can transform water governance and resource allocation. Project under this scope should build on and augment these efforts by introducing localized, low-cost sensor networks, drone-based geomorphological mapping, and automated river profiling tools that enable dynamic flood and sediment erosion assessment. Proposal must clearly show how their technologies improve on existing systems in terms of timeliness, accuracy, and operational efficiency, and how outputs can be integrated into basin-level planning frameworks and policies used by NWRB, DENR, and local government units (LGUs).

   Building on the DENR's Integrated Water Resources Management (IWRM) mandate to establish centralized monitoring and data systems, applicants should propose interoperable platforms that support multi-agency data sharing and visualization. Emphasis should also be placed on river geomorphology models that quantify sediment budgets and morphological change under extreme rainfall conditions, supporting both disaster risk reduction planning and sediment management interventions such as dredging prioritization and floodplain restoration.

2. S&T-Based Safe Water Systems (Assessment, Forecasting, and Intervention) – focused on water safety, availability, and climate-resilient management through

science-based assessment, forecasting, and targeted interventions. *(Maximum of One Project with a maximum total funding of Php 15,000,000.00)*

This scope focuses on developing science- and technology-based tools to ensure the safety, reliability, and climate resilience of water supply systems. The proposal should address risks to water sources arising from climate variability, flooding, drought, and pollution through integrated assessment and forecasting of water quantity and quality. The proposal should now include water and wastewater treatment, in addition to monitoring and predictive modeling, to ensure safe and sustainable water services. Priority should be given to advanced decision-support systems that enable early detection of water safety threats and guide operational management for water utilities, irrigation operators, and water resource managers.

Aligned with the Philippine Water Supply and Sanitation Master Plan (NEDA), the National Climate Change Action Plan (NCCAP), and the Integrated Water Resources Management (IWRM) framework, this scope emphasizes intervention-oriented research with clear operational applications. Projects are expected to support the development of S&T-based Integrated Water Management Plans (IWMPs) with clearly defined short-, medium-, and long-term strategies, which shall serve as a technical basis for LGUs and key stakeholders in managing water resources, addressing water-related hazards and wastewater, and implementing targeted S&T intervention projects. Proposals must include cost-comparative analyses of technological and nature-based interventions and demonstrate collaboration with relevant government agencies, water utilities, and local government units to ensure scalability and/or regional up to national applicability.

Specific Features Sought in this Call:

DOST invites proposals for the development of intelligent, cost-effective, and localized tools, methodologies, and technologies to enhance river and water management. This includes smart systems for flood monitoring, sediment management, river geomorphology, and water sustainability, addressing hazards such as flooding and drought through advanced forecasting and intervention strategies.

The program aims to address critical challenges such as river system degradation, sediment imbalance, water scarcity, and climate-induced hazards. Proposals should integrate climate change adaptation strategies aligned with the National Climate Change Action Plan (NCCAP), support the Philippine Water Supply and Sanitation Master Plan (2020) by NEDA, and adhere to the Integrated Water Resource Management (IWRM) framework by DENR. Solutions must promote sustainable practices and resilience in river and water systems.

Proposals must include a cost-comparative assessment of interventions, demonstrating improvements in monitoring, forecasting, and operational efficiency. Projects should contribute to the development of intelligent water management tools, guidelines, and operational protocols for both existing and future infrastructure.

Proponents are required to collaborate with relevant stakeholders, including technology providers, water utilities, government agencies, and end-users. A commitment letter and counterpart funding for project implementation are mandatory.

Sources:

1. World Resources Institute (WRI) - Aqueduct Water Risk Atlas
   https://www.wri.org/aqueduct
2. Philippine Statistics Authority (PSA) - 2020 Census of Population and Housing
   https://psa.gov.ph/content/2020-census-population-and-housing
3. National Water Resources Board (NWRB)
   https://www.nwrb.gov.ph/
4. PAGASA - Philippine Atmospheric, Geophysical and Astronomical Services Administration
   https://www.pagasa.dost.gov.ph/
5. Department of Environment and Natural Resources (DENR) - Integrated Water Resource Management
   https://www.denr.gov.ph/
6. Philippine Climate Change Commission - National Climate Change Action Plan (NCCAP) 2011-2028
   https://www.climate.gov.ph/our-programs/national-climate-change-action-plan
7. National Economic and Development Authority (NEDA) - Philippine Water Supply and Sanitation Master Plan
   https://www.neda.gov.ph/

Resilient and Smart Construction Solutions for Infrastructure Modernization

Call Rationale

The Philippine construction sector is under increasing pressure from rapid urbanization, evolving safety and quality standards, and climate-related hazards such as typhoons, floods, earthquakes, and extreme heat. These stressors expose gaps in materials performance, construction methods, digital readiness, and disaster resilience. To meet national infrastructure goals, there is a strategic need to modernize the sector through science-and-technology (S&T) interventions that improve durability, safety, productivity, and sustainability, while ensuring clear pathways for adoption and policy integration.

In the Philippines, national programs for construction resilience and modernization are primarily driven by large-scale infrastructure agendas and climate adaptation frameworks. As of late 2025, these initiatives emphasize integrating disaster-proof designs, sustainable materials, and digital technology into national development. The Build Better More (BBM) Program, the government's primary infrastructure agenda for 2023–2028, covers 198 high-impact flagship projects with a total investment of ₱8.8 trillion. It aims to modernize transport systems, water resources, and digital connectivity while ensuring these infrastructures are resilient to climate-induced shocks. Complementing this is the Philippine Development Plan (PDP) 2023–2028, which sets the overarching strategy for construction modernization and promotes inclusive, high-growth pathways through deep economic and social transformation in the infrastructure sector.

Climate adaptation frameworks further reinforce this direction. The National Adaptation Plan (NAP) 2023–2050 provides a long-term strategy to reduce vulnerability and build adaptive capacity, guiding the integration of climate resilience into building standards and infrastructure planning. Tools such as the Building Resilience Index (BRI) have been introduced to evaluate and verify a building's capacity to withstand environmental shocks, while programs like the Risk Resiliency and Sustainability Program (RRSP), also known as the Strategic Program for Climate Resilience, focus on enhancing the resilience of infrastructure and natural systems.

These national priorities are supported by sector-specific initiatives, including the Department of Public Works and Highways (DPWH) digitalization roadmap, the Department of Trade and Industry (DTI) through the Construction Industry Authority of the Philippines (CIAP) Philippine Construction Industry Roadmap 2020–2030, and housing programs led by the Department of Human Settlements and Urban Development (DHSUD) and the National Housing Authority (NHA), such as the Pambansang Pabahay Para sa Pilipino Program (4PH). Hazard data platforms like the Philippine Institute of Volcanology and Seismology (PHIVOLCS) GeoRiskPH. Professional bodies such as the Association of Structural Engineers of the Philippines (ASEP) and the Philippine Institute of Civil Engineers (PICE) are actively working on updates to the National Structural Code of the Philippines (NSCP) to reflect resilience standards and ensure compliance with evolving safety requirements. The Department of Science and Technology (DOST) complements these efforts by supporting research and development initiatives that strengthen innovation in infrastructure, promote collaboration among stakeholders, and enable technology transfer and commercialization. Through its programs, DOST provides resources and technical support to accelerate the development and adoption of science-based solutions for resilient and smart construction.

Together, these national programs and institutional efforts establish a strong foundation for this call for proposals. The goal is to accelerate innovation in resilient and smart construction solutions that align with national priorities, support climate adaptation, and enable digital transformation in the Philippine construction industry.

Call Objective

This call seeks science- and technology-based solutions that:

1. Enhance materials performance and sustainability for climate-resilient infrastructure.
2. Accelerate digitalization of construction workflows (e.g., BIM, digital twins, AI-driven monitoring) to reduce risk and increase productivity.
3. Strengthen engineering capacity through specialized facilities and tools supporting hazard-resilient design and analysis.
4. Advance localized, modular construction equipment and deployable systems for efficient, safe construction in diverse Philippine settings.
5. Improve building codes, standards, and guidelines through validated, science-based solutions, ensuring that new technologies and practices are backed by rigorous evidence and can be integrated into regulatory frameworks for nationwide adoption.

Call Scope

The R&D initiatives should address/cover the identified research areas:

1. Innovative Construction Materials (Two projects amounting to a total fund of ₱30,000,000.00)
   - This thematic area focuses on developing climate-adaptive, durable and sustainable construction materials suited for diverse Philippine environments and hazards, emphasizing the use of locally available resources and recycled materials **particularly** metals, rubbers, plastics and other non-agro-industrial waste streams. Solutions must undergo comprehensive performance benchmarking and durability testing, followed by controlled pilot-scale implementation in representative field conditions. These pilots should generate empirical data to validate structural resilience, cost-efficiency, and full compliance with Philippine building codes. Proposals should also present a clear roadmap for standards integration and adoption pathways to enable nationwide scalability and long-term impact.

2. Infrastructure Design, Analysis, and Standards Integration (One project amounting to a total fund of ₱40,000,000.00)
   - This thematic area emphasizes the development of advanced modeling and simulation tools for multi-hazard resilience, asset management, and lifecycle optimization. Proposals should aim to produce science-backed evidence packages that improve building codes, standards, and guidelines, ensuring integration into regulatory frameworks through collaboration with professional bodies and government agencies.
3. Integrated Digitalized Modular Construction Systems (Two projects amounting to a total fund of ₱55,000,000.00)
   - This thematic area focuses on the convergence of digital transformation and modular construction technologies to create safer, more efficient, and adaptive construction workflows. Proposals should aim to:
   - Develop interoperable digital platforms (e.g., BIM, digital twins, AI/ML-driven monitoring, automated QA/QC) that seamlessly integrate with modular construction equipment for real-time project management, predictive maintenance, and hazard-resilient operations.
   - Design and localize scalable, modular equipment embedded with smart sensors and IoT capabilities to enable automated construction, inspection, and lifecycle monitoring.

All proposals must:

1. Align with relevant national priorities and frameworks (e.g., infrastructure modernization, climate adaptation, and industry digitalization policies).
2. Demonstrate clear innovation and differentiation from existing practices.
3. Include adoption pathways (standards integration, regulatory/policy engagement) and commercialization/technology transfer plans.
4. Secure commitment letters from intended end-users and partners and outline counterpart contributions.
5. Define measurable outcomes, validation protocols, and schedules that align with the readiness of partner agencies.

Sources:

- COA. (2023). Infrastructure Audit Guidelines.
- DOST. (2023). Science for Change Program (S4CP), CRADLE, NICER Initiatives.
- Build Better More (BBM) Program: The central 2023–2028 infrastructure plan focuses on 198 flagship projects for connectivity and climate resilience. (Philippine Development Plan 2023-2028Infrastructure Chapter, Full List of Infrastructure Flagship Projects (IFPs), Infrastructure Modernization Status (June 2025 Report))
- National Adaptation Plan (NAP) 2023–2050: The strategic long-term roadmap for disaster-resilient building and climate adaptation.
- PHIVOLCS Modernization Act (RA 12180): Signed in April 2025, this law mandates a ₱7 billion modernization to enhance seismic monitoring and update structural safety standards. (Official Gazette: Republic Act No. 12180 Full Text, PHIVOLCS Press Release on RA 12180)
- Construction Industry Authority of the Philippines (CIAP): Oversees the modernization of the domestic construction industry and regulatory streamlining. (CIAP Official Website & Industry Roadmap, Construction Industry Revitalization Action Plan)
- Building Information Modeling (BIM) & Digital Transformation: Part of the 2020–2030 Roadmap to modernize construction workflows.(Construction Performance and Digital Transformation Guidelines)

- Communities for Resilience (CORE) Program: Technical training for engineers and local officials on integrating science into local construction.

- 2025 National Budget Technical Notes: Outlines funding for construction modernization across the DPWH and DBM. (DBM Technical Notes on the 2025 Budget)

- DPWH. (2023). *Build Better More Program Overview*.
- DTI-CIAP. (2020). *Philippine Construction Industry Roadmap 2020–2030*.
- DHSUD. (2023). *Pambansang Pabahay Para sa Pilipino Program (4PH)*.
- NHA. (2023). *Resettlement Assistance Program*.
- CCC. (2023). *National Adaptation Plan 2023–2050*.
- PHIVOLCS. (2023). *GeoRiskPH Platform*.
- PAGASA. (2023). Impact-Based Forecasting System.
- ASEP. (2023). National Structural Code of the Philippines.

Transportation

1. Logistics

Call Rationale

AmBisyon Natin 2040, identifies “connectivity” through roads, bridges, ports, vehicles, and transport systems as a “priority sector” as critical for the Philippines’ economic and social transformation and competitiveness. The recently published Philippine Development Plan (PDP) 2023-2028 acknowledges transport and logistics as key in linking markets to each other and in facilitating the movement of people and goods.

Towards this end, national government agencies, such as the Department of Trade and Industry (DTI), the Department of Transportation (DoTr), and the Department of Public Works and Highways (DPWH), have formed a collaboration to launch initiatives that aim to facilitate the seamless movement of goods. The Pagtanaw 2050 by the Department of Science and Technology has also foregrounded the role of transportation, especially considering the country’s maritime and archipelagic environment. For its part, the Council has also formulated transportation roadmaps in support of these thrusts.

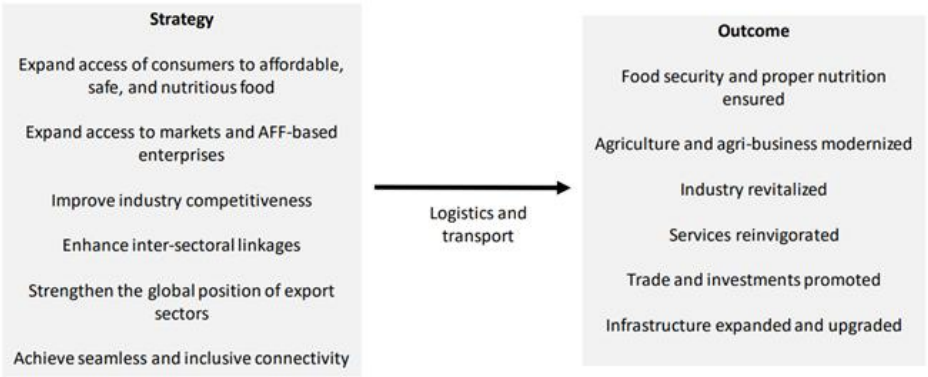


Figure 1: Logistics and transport as a key component of the strategy to achieve national outcomes (Adapted from PDP 2023-2028)

In a series of consultations conducted by the Council in 2022, the theme of “digital transformation of the transport sector” emerged as a prominent area suggested by the

stakeholders (see, for example, Sunio et al, 2022). Digitalization has for many years been supported by the Council, as can be seen in its Transport S&T Roadmaps (2020-2024). Moving forward, we aim to further support the digital transformation of the transport sector in the following areas: (a) human element and training, (b) cargo and logistics, (c) maritime safety, and (d) vessel management. The need for digitalization was in no small part catalyzed by the COVID pandemic, which fueled rapid digitalization across the globe.

Call Objective

The objective of this call is to provide science and technology intervention to accelerate the digital transformation of the transport and logistics sector. Digital transformation may result in greater efficiency in the delivery of services and in increased industry competitiveness. We are interested specifically in the digital transformation of the following:

- Logistics sector through the adoption of the physical internet paradigm

Call Scope

The R&D initiatives should address/cover the identified research areas:

1. The Digital Transformation of the Logistics Sector

   A. Development of proof-of-concept in support of the implementation of the physical internet for urban and maritime logistics *(Maximum of 2 projects with a maximum total funding of PHP 10,750,000)*

   Since the physical internet is a new paradigm in the Philippines, there is a need first to persuade potential stakeholders from the logistics sector of the viability of implementing the physical internet in the Philippines. In this regard, proofs of concept (POC) are needed. They can be simulation- or field-based proofs of concept, which aim to gradually implement and test key functions of PI-enabled interconnected logistics. The POCs must demonstrate how the industry may look like in comparison to the status quo and the potential gains that may be expected when partially and fully transitioning to the Physical Internet.

   Mentioned in the national logistics master plan of the Department of Trade and Industry (DTI) as a key action area where DOST can contribute to, this project aims to utilize information and communication technologies to facilitate the seamless movement of cargo from ports to urban areas. Such emerging ICT may enable the integration of ports and cities for efficient freight movement and logistics.

2. Maritime Transport

Call Rationale*:*

The Philippines, as an archipelagic nation with over 36,000 kilometers of coastline and a heavy reliance on maritime transport, faces growing challenges related to port emissions, fuel dependency, and the modernization of its maritime fleet. Tugboats—critical assets for harbor operations, ship assist, and port safety—operate intensively within confined port areas and are among the highest fuel-consuming and emissions-intensive vessels per operating hour. These characteristics make tugboats ideal candidates for electrification.

However, the Philippine maritime industry faces persistent challenges, including high greenhouse gas emissions, aging vessel fleets, limited adoption of clean technologies, safety and efficiency gaps, climate vulnerability, and fragmented research and innovation capacity. These challenges are further intensified by global commitments to decarbonization, such as

the International Maritime Organization's (IMO) emissions reduction targets, and by increasing climate risks affecting ports, coastal infrastructure, and shipping routes.

At present, maritime research and development efforts in the Philippines remain dispersed across institutions, with limited coordination between government, academia, industry, and local communities. This fragmentation constrains the country's ability to generate evidence-based policies, develop indigenous maritime technologies, and build a skilled workforce aligned with sustainable and resilient maritime transport systems.

MARINA's Maritime Industry Development Plan (MIDP) 2019–2028 prioritizes the promotion of an environmentally sustainable maritime industry, which includes reducing pollution from vessels and implementing marine environment protection strategies. Electric tugboats contribute directly to these goals by cutting greenhouse gases (GHGs), air pollutants, and noise in port operations.

Electric Tugboat R&D is timely and strategic for the Philippines. It addresses environmental sustainability, energy security, and port modernization while fostering local innovation and industry capability. By investing in e-tugboat research and pilot deployments, the country can accelerate the transition toward cleaner, more efficient, and resilient maritime transport systems—starting from its ports, where the impact is immediate and measurable.

The establishment of a Sustainable Transportation and Energy Systems Research Laboratory responds directly to these gaps. The Center will serve as a national hub for interdisciplinary research, technology development, policy support, and capacity building focused on low-carbon, safe, inclusive, and climate-resilient maritime transport. It will support innovation in areas such as green ship design, alternative fuels, port sustainability, digitalization, maritime safety, and adaptation to climate change.

The global transition toward sustainable, low-carbon transportation and energy systems is accelerating, driven by climate change imperatives, energy security concerns, rapid urbanization, and advances in electrification, digitalization, and artificial intelligence. In the Philippines, this transition presents both opportunities and challenges: the need to deploy reliable electric mobility, renewable-energy-based microgrids, and smart energy systems while ensuring safety, performance, affordability, and local technical capacity.
Sustainable transportation systems, such as electric vehicles (EVs), electric marine propulsion, rail electrification, and intelligent transport systems, are increasingly coupled with advanced energy systems, including renewable generation, energy storage, power electronics, and microgrids. These integrated systems require rigorous testing, verification, and validation before deployment. However, there is a significant gap in local facilities that can systematically test hardware, software, and system-level performance under realistic operating conditions.

The proposed Sustainable Transportation and Energy Systems Research Laboratory (STESRL) aims to address this gap by establishing a dedicated facility for research, testing, demonstration, and capacity building in sustainable transportation and energy systems. The laboratory will serve as a platform for research and development (R&D), industry collaboration, policy support, and human resource development.

Call Objective

To develop, demonstrate, and enable the adoption of electric and hybrid-electric tugboat technologies that reduce emissions, improve energy efficiency, and enhance the sustainability and competitiveness of Philippine port operations.

- Design and Development of a Hybrid-Electric Tugboat for Low-Emission Philippines Port Operators
- Sustainable Transportation and Energy System Research Laboratory (STESRL)

Call Scope

The R&D initiatives should address/cover the identified research areas:

Covers research, development, demonstration, and pre-commercialization activities that support the design, validation, and deployment of electric and hybrid-electric tugboat technologies suitable for Philippine port operations. Projects under this call may address one or more of the areas implementations *(Maximum of 1 project with a maximum total funding of PHP 60,000,000)*

This call supports the establishment and initial operation of a Sustainable Transportation and Energy Systems Research Laboratory (STESRL) that will function as a national hub for research, innovation, policy support, and capacity building in sustainable maritime transport. Project under this call may address one or more areas implementation (Maximum of 3 projects under 1 program with maximum total funding of PHP 200,000.00).

Sources:

The following materials are suggested for further reading. These are write-ups prepared after the stakeholders' consultations:

Sunio, V., Santos, E., Baleta, F. and Tabañag, I (2022). "Research and Development Agenda for the Philippine Maritime Sector: Results from Stakeholder Consultations". https://ncts.upd.edu.ph/tssp/wp-content/uploads/2023/01/TSSP2022_02.pdf

Special Issue on the Digital Transformation of Transportation.

https://innovatus-pub.github.io/abstractpublications_archive/abstractpublications_2022b.html

Maritime Industry Development Plan (MIDP) 2019-2028 - MARITIME INDUSTRY AUTHORITY

III. Industrial Technology

Food Sector

Call Rationale

The Philippine food and beverage (F&B) manufacturing industry continues to serve as a cornerstone of the economy, retaining its position as the country's largest manufacturing sector. In 2024, F&B accounted for over Php 2.41 trillion or 53% of total manufacturing gross value added (GVA), growing 5.6% for the year (PSA, 2024). In terms of exports, agri-food products are valued at Php 420.5M which constitute 9.75% of the country's total exports in 2024 (PSA and DTI-EMB, 2025). The growing trend in the sector persisted into early 2025, with the Monthly Integrated Survey of Selected Industries (MISSI) reporting a 9.3% increase in the value of production for food products in January 2025, making it the top contributor in driving the overall momentum of local manufacturing industries (PSA, 2025).

Despite its continued growth, the sector faces persistent vulnerabilities. Global supply chain disruptions, climate-related risks, and shifts in market requirements and consumer demand patterns continue to influence raw material availability and processing efficiency. The need for resilience is also further elevated by ongoing challenges in food security, with 3 in every 10 households (31.4%) still experiencing moderate to severe food insecurity (FNRI, 2024), while 44.0% of the population or 51 million people remain unable to afford a healthy diet (FAO, 2025). This underscores the importance of integrating innovation for sustainability and local resource utilization in food system transformation efforts as embodied in national policies including the National Food Policy Manual, National Agriculture and Fisheries Modernization and Industrial Plan 2021-2030, and the Philippine Foresight on Science, Technology, and Innovation.

With its commitment in enhancing industry sector productivity, PCIEERD continuously fosters the development and implementation of programs for improved market competitiveness, safety, and sustainability of the food and beverage manufacturing industry through innovative technologies and interventions. The Food Sector is one of the Council's largest priority sectors. With considerable support through both DOST and PCIEERD grants-in-aid (GIA) programs, the sector received a total of Php 2.2 billion for 167 projects from 2011-2024, coming in second to Space Technology Applications together with the agro-industrial and chemical process sectors.

This support is as specified in the Harmonized National R&D Agenda 2022-2028 for Industry, Energy, and Emerging Technologies, and in support of the UN Sustainable Development Goals No. 2 on Zero Hunger and No. 12 on Responsible Production and Consumption. This is aligned with efforts towards the following food security and nutrition outcomes identified in Chapter 3 of the Philippine Development Plan 2023-2028 and the Philippine Food Systems Transformation Pathway:

- Improved access to safe and nutritious food
- Shift to healthy and sustainable consumption patterns
- Boosted nature-positive production at scale
- Advanced equitable livelihood and value distribution
- Built resilience to vulnerabilities, shocks, and stresses

Call Objectives

This Call aims to continue supporting effective programs and strategies for (1) ensuring product safety and quality, (2) utilizing local products to reduce imports of raw materials for food processing, (3) developing technologies for the conversion of "waste-materials" into value-added products, (4) development of capabilities for the food sector, (5) optimizing digital platforms for the food value chain, and (5) conduct of joint research on new processing technologies and systems in response to global trends for a more sustainable and resilient agri-food sector.

Call Scope

This Call covers the following programs of the Food Sector with specific priorities presented in the next sections and as validated with stakeholders:

1. Food Innovation Program
2. DOST Integrated Food Safety Program
3. DOST Halal S&T Program

Specific Features Sought for all Food Sector Programs:

1. The implementing agency and proponent should have a track record and established expertise on the proposed project.

2. For project leaders with on-going projects, updated reports for their respective projects should be submitted (i.e. technical progress and terminal and audited financial report). For completed projects, clearance from the funding agency from any obligations under the project.
3. A collaborative undertaking among institutions is encouraged. Institutions from other region/s working on similar or related research areas may also be engaged given their capability and commitment.
4. The proposal must include the following details:
    a. Detailed Review of Literature by including previous works and/or relevant studies where the proposal will take off.
    b. Sound scientific basis including:
        - Relevant data and literature to provide situationer for the pressing national problems to be addressed
        - Appropriate experimental design and statistical analyses
        - Advantages and differentiation over existing similar technologies/studies
    c. Information on potential socio-economic impact and marketability:
        - Projected employment generation after completion of the project. Identify the possible specific jobs to be involved and estimated number of personnel needed.
        - Estimated increase in income/productivity
        - Current demand and potential market expansion
    d. Advantages of the proposed intervention and its target cost over the existing/commercially available/similar interventions
    e. Potential impacts to the identified industry partner or partner institution.
    f. Data on how the project can contribute to the improvement of environmental conditions by including any possible environmental impact from the proposal and waste management plan
    g. Adequate counterpart funding from the implementing and partner agencies
    h. Counterpart resources (e.g. facilities, equipment) available in implementing and partner agencies
    i. Letter of commitment from identified cooperating agencies willing to test and/or adopt the project output.
    j. Risk Management Plan
    k. Technology Roadmap

4. Clear plans for utilization of project results:
    a. Specify mechanisms for the sustainability of operations
    b. Strategies for wider adoption by indicating how the project results can be scaled up to be widely used or available
    c. Details on how the target beneficiaries will participate or benefit from the project
    d. Plans for promotion and transfer of technology to end-users
5. Sustainability plan including established mechanisms in terms of institutional, financial, and human resources capability after project completion

I. Food Innovation Program

The Food Innovation Program was conceptualized with the vision to make local industries more sustainable and geared towards innovative food products with better quality and improved safety that responds to the population's nutritional and health requirements. The program aims to help address the following challenges identified relative to the ASEAN integration in 2015 continue to affect the local industries: 1) Continued dependence on imported raw materials; 2) Need for improvement or innovation in local technology; 3) Ability to consistently deliver the required level of quality and food safety. To address these concerns, an array of possibilities exists for innovation - from the sourcing of raw materials, processing, packaging, including marketing and distribution systems.

Since 2021, there have been 39 projects implemented under the Food Innovation Program with 216.9M funding support. Processing technologies available at the Food Innovation Centers such as thermal processing, spray drying, and cabinet drying are the majority of technologies used in these projects. These led to both scientific and market-driven output by generating 70 products, 38 licensing agreements with industry partners, 16 IPs, 42 publications, 646 researchers trained, and 12 policies. For 2025, 4 projects were approved under the Food Innovation program.

The priorities under the Food Innovation Program were revisited with 63 representatives from the industry, academe, and government through a consultation held back-to-back with a forum in November 2025 with the theme: *Facilitating Food Futures: Science and Innovation Solutions for the Philippine Food Industry 2050*.

Priorities

1. *Enabling Technologies for Food Innovation* - these include projects on establishment or upgrading of processing centers and other facilities, building capabilities, and enhancing systems that impact the food sector as a whole:
    - New Processing and Packaging Technologies for Local Food Industries
        - Nutrition-sensitive food processing technologies
            - Freeze Concentration Technology (for coconut water, calamansi, mangosteen, and other juices)
            - Isochoric Freezing
            - Irradiation Technology
            - High Pressure Processing

    - Processing Technologies for Sustainable Food Products (i.e. Plant Based Food, Alternative Proteins for meat, egg, and dairy, enzymes for food)
        - Extrusion Technologies (Dry, High Moisture, Thermal)
        - Fermentation Technologies (Biomass and Precision Fermentation)
        - Microwave assisted thermal processing technologies
        - Cell-based food processing
        - 3D printing for food applications
    - Smart Food Packaging Solutions
        - Sustainable food packaging from algae and seaweed sources
        - Self-heating and cooling mechanisms for food packaging
        - Predictive analytics in food packaging

2. *Innovative Food Products* - these include projects on new product development for ingredients or intermediate food, emergency food, and other novel food products:
    - Valorization of Food Processing Industry By-Products and Seasonal Production Surplus for Food Applications as Food Ingredients/Additives
        - Food fibers (Bamboo, Ginger, Corn, etc.)
        - Modified starches (Coconut, Corn, Yam, Tapioca)
    - Sustainable and Healthier Alternative Food Products Using Local Sources
        - Alternative meat, egg, and dairy products (coconut, legumes, seed sources, etc.)
        - Alternative Salt products (yeast, seaweed, low-sodium alternatives)
        - Alternative Food Colors (plant, microbial-based sources)
        - Alternative fats and oils (legumes, seed sources, etc.)

3. *Specific Industry or Regional Concerns* - these include projects conceptualized to address a particular problem or challenge of a company or an industry group with the intent to adopt

and commercialize the technology. Proposals under the Collaborative Research and Development to Leverage Philippine Economy (CRADLE) fall under this theme:

- Localization of air classification processing technology
- Development of local glucomannan and derivative food products
- R&D on emerging areas in sensory science and rheology
- Integrated technologies for citrus processing
- Integrated technologies for seaweed processing
- New Food Innovation Centers Program

Target Number of Projects: 5
Total Budget: 50M

II. DOST Integrated Food Safety Program

The Republic Act 10611, or the Food Safety Act of 2013, establishes the national framework for ensuring food safety and quality across the entire farm-to-fork chain. It underscores that safeguarding the local food supply is a shared responsibility—from production and postharvest handling to processing, distribution, and consumption. To support this mandate, robust R&D and S&T initiatives remain essential.

The Department of Science and Technology (DOST) advances the implementation of the Food Safety Act through the DOST Integrated Food Safety Program. Technical Working Groups formed in 2021—comprising DOST Councils, Research and Development Institutes, and Regional Offices—lead various program components. The R&D TWG is headed by PCIEERD; S&T Services by the Food and Nutrition Research Institute (FNRI); Human Resource Development by DOST-CALABARZON; and Knowledge and Technology Transfer and Policy Advocacy by the Technology Application and Promotion Institute (TAPI) and the National Research Council of the Philippines (NRCP).

Since 2021, the program has supported 15 projects with Php 177.9 million in funding, resulting in 227 trained food safety officers, 77 potential DOST risk assessors, 49 food safety manuals and protocols, upgraded laboratories, several publications, and updated national standards. Improved compliance has also been observed among food MSMEs, with 648 meeting food safety requirements and 180 securing FDA License-to-Operate. The Council continues to strengthen the program, with priorities refined by the DOST Food Safety R&D Technical Working Group, and two (2) new projects approved in 2025.

Priorities

Under *Food Safety Research & Development:*

- Development of MSMEs' Traceability Systems
- Development of DNA Metabarcoding and Spectroscopic Techniques for food authenticity and traceability of local products

Specific Features Sought in the Call:

- Clearly presented values or the corresponding opportunity cost for the proposed interventions. This can include details on potential socio-economic impact in terms of the projected increase in productivity of risk managers or additional income of industry, as well as potential benefits in terms of public health.
- Defined partnerships or collaborations with food safety regulatory agencies and other relevant institutions for the project implementation and sustainability of operations

Target Number of Projects: 2
Total Budget: 30M

III. DOST Halal S&T Program

The Philippine Halal Industry Development Strategic Plan 2024–2028 aims to position the Philippines as a leading halal- friendly hub in the Asia Pacific region by fostering a collaborative, customer centric, and competitive ecosystem. The national targets include attracting ₱230 billion in investments, generating 120,000 jobs, and achieving a 20% annual growth rate for halal-compliant enterprises.

As part of the Philippine Halal Export Development Board under RA 10817, the DOST implements the Halal S&T Program to provide scientific and technical support for the industry's development. The program covers four key areas: (1) Research and Development, (2) Human Resource Development, (3) Knowledge Transfer and Policy Advocacy, and (4) Halal Verification Laboratory Testing. These initiatives strengthen industry capabilities, enhance standards for global competitiveness, and promote broader halal awareness.

Since 2021, there are 15 projects implemented under the DOST Halal S&T program handled by PCIEERD, with a total funding support of Php 40.3M. Through the program, DOST established the 4 Halal Verification Laboratories in CALABARZON, Davao, Region 12, and BARMM that support Halal testing of food products. There were also 14 developed Halal Assurance System manuals, modules, and protocols for food products and ingredients for adoption by local Halal food processors. Policies were put forward with 6 regional development and DOST Halal Committee Resolutions. The Human Resource Development component also provided capacity building for 55 certified Halal lead auditors and 31 DOST Halal trainers ready for service to MSMEs. Through the program, there were 44 companies assisted and 2,293 industry personnel trained for Halal compliance.

To continue its holistic intervention in strengthening the Halal ecosystem of the country, the Council maintains the priorities on Halal as consulted with the DOST Halal S&T Program TWG led by DOST XI in November 2025.

Priorities

Under Halal *Research and Development*

- Halal Modest Fashion

Under Halal *Knowledge Transfer and Policy Advocacy:*

- Establishment of Halal Knowledge Center as central repository with online database of R&D output and Halal-related activities

Specific Features Sought in this Call:

- For the Halal Knowledge Center:
    - Endorsement by the DOST Halal S&T Program Leader
    - Strategic location in establishing the center and provide the capacity and how the operationalization will take place after the project completion.

Target Number of Projects: 2
Total Budget: 20M

Process Sector

PCIEERD under the Process Sector covers the process industries where the primary production processes are either continuous or occur on a batch of materials that is indistinguishable such as chemicals, pharmaceuticals, petroleum, plastics, rubber, textiles, tobacco, food, beverages, etc. as cited by IISE (Institute of Industrial and Systems Engineers, US).

The Process Sector of PCIEERD invites Research and Development proposals for the following programs to assist specific key industries in the country:

A. *Natural Products Program*
B. *Chemical and Biological Manufacturing and Allied Industries Program* for (a) Green Polymer
C. *Textiles Program*
D. *Agro-Industrial Processing Program*

With CFP 2027, the Process Sector aims to:

1. Assist the identified sub-sectors in their S&T needs through R&D Programs and interventions resulting to increased competitiveness of the industry
2. Engage the R&D Institutes and Academe in collaboration with the industry in developing R&D programs for the identified research calls
3. Contribute to the development of the industries by enabling R&D programs that are anchored/aligned to the following:
    1.4 Existing PCIEERD Roadmaps or its corresponding industry roadmap from government agencies (e.g., DTI and DA)
    2.4 DOST Harmonized National R&D Agenda 2022-2028 under Section 4.II.V Industry, Energy and Emerging Technology Research and Development Agenda 2022-2028
    3.4 Philippine Medium-Term Development Plan 2023-2028 under Chapter 8 Advance Research and Development, Technology and Innovation in support to Outcome2: Market-driven and customer-centered research and development and Outcome 3: Technology extension, adoption, utilization, and commercialization scaled-up.
    4.4 Goal 9 of the Sustainable Development Goals, specifically under 9.5 *Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending*

A. NATURAL PRODUCTS PROGRAM

The Natural Products subsector is the program focused on products from extraction and downstream processing from agricultural and marine sources (Colors, Gums, Resins, and Oils) that would serve the needs of various industries such as personal care, cosmetics, food, household products, and non-active components of pharmaceuticals which do not claim medical or health benefits on the top diseases (e.g. pneumonia, heart disease, etc.) prevalent in the Philippines.

Call Rationale

According to Business Research Insights, the global natural and organic cosmetics market was valued at USD 11.51 billion in 2023 and is projected to grow at a CAGR of 7.5%, reaching USD 22.06 billion by 2032. The growth of the natural and organic products market is driven by a rising preference for natural personal care products, attributed to health awareness and concerns over synthetic ingredients. Consumers are increasingly drawn to the proven safety and effectiveness of natural ingredients, along with increasing demands for transparency in product composition. Growing awareness of the benefits of natural formulations further accelerates market expansion. These trends highlight significant opportunities for innovation and expansion in the industry (www.technavio.com, www.thebusinessresearchcompany.com).

On November 2025, a stakeholder consultation meeting with the Philippine Society of Cosmetic Science and local cosmetic companies were conducted to review the roadmap's midterm action plan for the 2027 to 2028 period. During the meeting, several pressing challenges were identified by the industry partners with highlight on emerging technologies for processing of natural products for cosmetic applications. The call also addresses the anticipation of functional cosmetics in the regulatory framework.

Call objective

The objective of this call is to develop innovative technologies to enhance quality and even create new market segments for the use of natural products. This is to take advantage of the momentum driven by strong market demand on natural products with wide array of industrial application: food additives such as flavors and fragrances, and colors for food, also colors for textiles and paint, dyes, industrial enzymes as catalysts, and natural polymers that may not be commonly associated with the popular natural products. It will utilize indigenous resources through provision of relevant technologies that results in increased yield, improved quality, and a more cost-effective process.

Call scope

The R&D proposal may include the following potential study areas:

1. Extraction, Characterization and Standardization of Natural Products for high value industrial applications
2. Extraction, Characterization of natural products with the use of Emerging Technologies - pulsed electric field (PEF), high pressure processing (HPP), Carbon dioxide (CO2) extraction
3. Development of Evidence-Based Functional Cosmetic Ingredients and Formulations

Specific Features Sought in this Call

The proposals should demonstrate the following key characteristics and should be well-written in the documents. Missing any of these components will result in lower prioritization:

1. Must result from industry consultations and address the specific needs outlined in the roadmap.
2. Must have a comprehensive review of existing literature, ensuring the proposal concept is not redundant with ongoing local research.

3. Must have a Technology Readiness Level (TRL) between 4 and 7, demonstrating technical feasibility through an established proof of concept. Proposals intending to establish proof of concept TRL 1-3 will not be prioritized.
4. Must consider both the supply chain for raw materials and the long-term viability of the finished product.
5. Must strongly engage key players across the value chain (ie. upstream, midstream, and downstream partners) is essential for the successful development and commercialization of a product or technology.

   We define upstream as the source of raw materials or inputs; midstream refers to the stage where the product or service is manufactured or processed; and downstream represents the end-users who typically influence the product's performance, characteristics, and competitive pricing.

   a. Each partner's role should be clearly defined, specifying their responsibilities, contributions, and any counterpart funding that supports the project.
   b. A commitment letter from industry partners showing interest in the product's commercialization, ideally confirming their use of the resulting technology.
6. Must demonstrate a robust economic analysis to support the proposed product's financial sustainability.
7. The proposed budget for R&D should be commensurate with the market demand for innovation, product improvement, and the technologies being developed. It is crucial to allocate resources based on the expected impact and potential return on investment, ensuring that R&D efforts align with evolving consumer needs or market gaps.
8. For project leaders with on-going projects, updated reports for their respective projects should be submitted (i.e. technical progress and terminal and audited financial report). For completed projects, clearance from the funding agency from any obligations under the project.

PCIEERD will fund/endorse at least 2-3 projects and not to exceed Php 70 M budget covering all projects. The maximum duration for each project is 2 years.

B. CHEMICAL AND BIOLOGICAL MANUFACTURING AND ALLIED INDUSTRIES PROGRAM

This program will be carried out by supporting R&D initiatives on but not limited to, chemicals and allied industries, and food products. The products cover basic and specialty chemicals, manufacturing products by predominantly chemical processes [2], chemical preparations [3], sensors, chemical and biological reference materials and standards, and related technologies.

This program will also support the research agenda of the Philippine Chemical Industry Roadmap 2023-2028: Enabling Industry Linkages, Sustainability, Safer Materials and Operations, and Productivity of the *Samahan sa Pilipinas ng mga Industriyang Kimika* (SPIK).

Call rationale

Green Polymer Research

The Philippines has continuously contributed to the solid waste crisis which is projected to increase by 165% by 2025. In October 2022, key stakeholders convened in a national forum organized by the United Nations Development Programme (UNDP) together with the government of Japan and DENR to discuss the position of the Philippines in the Circular Economy and revisit the plans to avert pressing climate crisis through the commitment of the Philippines in the Paris Agreement of 75% greenhouse gas emission reduction by 2023.

In line with this, The Extended Producer Responsibility Act of 2022 (EPR Law) was enacted in July 2022 requiring large companies to recover a certain percentage of their annual use of plastic in packaging materials.

On 10 October 2024, the Science Technology and Innovation for Circular Economy (STI4CE) Framework was launched. It is designed to integrate science, technology, and innovation into the transition towards a circular, green, and sustainable economy. In the launching, research areas under the following thematic areas were identified:

1. **Think Green** *Understanding, planning, and attitude towards circular economy*
2. **Make Green** *Cleaner processes, waste valorization and treatment technologies*
3. **Turn Green** *Technology Transfer and Commercialization*
4. **Keep Green** *Strategic actions towards sustainability*

In support of this initiative, the Process Sector will contribute by enabling the Make Green and Turn Green research areas through the development of sustainable polymers from locally sourced raw materials towards a more circular economy.

Call objective

This call aims to support R&D programs that will improve and develop technologies to enhance chemical and biological manufacturing and allied industries with economic, trade, human security, and health relevance. This is to also position the Philippines in a competitive advantage through a scientific-enabled research framework.

Call scope

The R&D proposal may include the following potential study areas:

1. Low-cost technology on performance improvement of sustainable polymers
2. Valorization of agricultural wastes towards high-value industrial applications
3. Innovative Approaches for the Safe Use and Regulatory Compliance of Controlled Chemicals

Specific Features Sought in this Call

The proposals should demonstrate the following key characteristics and should be well-written in the documents. Missing any of these components will result in lower prioritization:

1. Must result from industry consultations and address the specific needs outlined in the roadmap.
2. Must have a comprehensive review of existing literature, ensuring the proposal concept is not redundant with ongoing local research.
3. Must have a Technology Readiness Level (TRL) between 4 and 7, demonstrating technical feasibility through an established proof of concept. Proposals intending to establish proof of concept TRL 1-3 will not be prioritized.
4. Must consider both the supply chain for raw materials and the long-term viability of the finished product.
5. Must strongly engage key players across the value chain (ie. upstream, midstream, and downstream partners) is essential for the successful development and commercialization of a product or technology.

   We define upstream as the source of raw materials or inputs; midstream refers to the stage where the product or service is manufactured or processed; and downstream represents the end-users who typically influence the product's performance, characteristics, and competitive pricing.

   a. Each partner's role should be clearly defined, specifying their responsibilities, contributions, and any counterpart funding that supports the project.
   b. A commitment letter from industry partners showing interest in the product's commercialization, ideally confirming their use of the resulting technology.
6. Must demonstrate a robust economic analysis to support the proposed product's financial sustainability.
7. The proposed budget for R&D should be commensurate with the market demand for innovation, product improvement, and the technologies being developed. It is crucial to allocate resources based on the expected impact and potential return on investment, ensuring that R&D efforts align with evolving consumer needs or market gaps.
8. For project leaders with on-going projects, updated reports for their respective projects should be submitted (i.e. technical progress and terminal and audited financial report). For completed projects, clearance from the funding agency from any obligations under the project.

PCIEERD will fund/endorse at least 3 projects not to exceed Php 50M budget covering all projects. The maximum duration for each project is 2 years.

C. TEXTILE PROGRAM

The Textile sub-sector covers products that develop and make use of fibers, yarn intermediates, yarns, fabrics, and end-user products that retain all the strength, flexibility, and other typical properties of the original fiber or filaments. This is based on the Standard Terminology Relating to Textiles, ASTM D123 – 19.

Call rationale

According to the Philippine Statistics Authority, as of November 2024, the textile industry contributes 1.01% (~Php 28.170 billion, based on constant 2018 prices) to the gross value added in the Philippine Manufacturing sector. [Q3 2024 NAP PSA] The year-on-year value on production index of manufacturing textiles registered a growth rate of 0.65% in January-

October 2024 compared to a decrement of 0.60% in the same period of 2023. In terms of the value of net sales index, the manufacture of textiles rose to a positive annual growth rate of 3.16% in January-October 2024 from its decline rate of 1.09% in the same period of 2023. [MISSI 2024, MISSI 2023] In the Philippine Export Development Plan, the target average annual growth rate for fabrics and wearable exports is 8.3% for 2023-2028. [PEDP 2023-2028] According to Foreign Buyers Association of the Philippines (FOBAP) President Robert Young, Philippine exports of a major end-product of textiles (apparel) are projected to reach a value of $1 billion in 2025 due to a favorable environment created by the start of free trade agreement with South Korea and incentives under the Corporate Recovery and Tax Incentives for Enterprises (CREATE) Act. [Apparel exports seen to hit $1 billion next year - FOBAP] With an ever-increasing apparel and industrial demand for textiles and growing awareness on the environmental impacts of its life cycle, there is an expected surge in demand for natural fibers as consumers shift to a more sustainable product option. [https://www.grandviewresearch.com/industry-analysis/textile-market]

Between 06-21 November 2024, various industry stakeholders were consulted to review the roadmap's midterm plan for 2027 to 2028 period. The industry's needs became apparent with a universal call to increase the utilization of local natural fibers (i.e. abaca) and develop a more sustainable, cost-effective, and efficient means of fiber processing and functionalization. However, a common sentiment among the stakeholders is the difficulty of processing and blending natural fibers with other commercial fibers.

In line with these themes, the R&D priority areas on local and sustainable fiber sources, processing, and finishing are reflected in the call scope.

Call objective

The objective of this call is to support R&D programs that will improve and develop technologies to enhance textile production using natural fibers and other low-cost, sustainable and comparable sources and create new materials for textiles with improved properties. To contribute to the economic status of the Philippine Textile industry, the market value of the target products should be highlighted to esteem endorsement for R&D support.

Call scope

The R&D initiatives may include the following potential study areas:

1. Regenerated cellulose fiber with high market demand and sustainable source
2. Cost-effective recycling of post-industrial polymers and textile wastes to produce filaments and staples
   2.1 low-cost process with high industry impact
   2.2 novel or advanced recycling methods to improve quality of recycled fibers
3. Technology interventions to improve incorporation of local natural fibers

Specific Features Sought in this Call

1. Must result from industry consultations and address the specific needs outlined in the roadmap.
2. Must have a comprehensive review of existing literature, ensuring the proposal concept is not redundant with ongoing local research.

3. Must have a Technology Readiness Level (TRL) between 4 and 7, demonstrating technical feasibility through an established proof of concept. Proposals intending to establish proof of concept TRL 1-3 will not be prioritized.
4. Must consider both the supply chain for raw materials and the long-term viability of the finished product.
5. Must strongly engage key players across the value chain (ie. upstream, midstream, and downstream partners) is essential for the successful development and commercialization of a product or technology.

   We define upstream as the source of raw materials or inputs; midstream refers to the stage where the product or service is manufactured or processed; and downstream represents the end-users who typically influence the product's performance, characteristics, and competitive pricing.

   a. Each partner's role should be clearly defined, specifying their responsibilities, contributions, and any counterpart funding that supports the project.
   b. A commitment letter from industry partners showing interest in the product's commercialization, ideally confirming their use of the resulting technology.
6. Must demonstrate a robust economic analysis to support the proposed product's financial sustainability.
7. The proposed budget for R&D should be commensurate with the market demand for innovation, product improvement, and the technologies being developed. It is crucial to allocate resources based on the expected impact and potential return on investment, ensuring that R&D efforts align with evolving consumer needs or market gaps.
8. For project leaders with on-going projects, updated reports for their respective projects should be submitted (i.e. technical progress and terminal and audited financial report). For completed projects, clearance from the funding agency from any obligations under the project.

PCIEERD will fund/endorse at least 3 projects not to exceed Php60M budget covering all projects. The maximum duration for each project is 2 years.

D. AGRO-INDUSTRIAL PROGRAM

The Agro-industrial Program is the sub-sector of the economy where farming meets technology. The main focus of this sub-sector is to uplift the lives of the country's farmers by introducing research and development to boost productivity, to improve existing products and create new ones, and to support or change existing policies with science.

This sub-sector complements ISPs of PCAARRD, where PCAARRD focuses on upstream industry, which covers genomics, plant cultivation, and up to harvest; while PCIEERD handles the R&D on the downstream processes - product development, by-products processing and/or conversion, and other post-harvest processing.

For CFP CY 2026, one commodity will be prioritized based on active initiatives of industries that expressed and supported the research agenda on the downstream processing of rubber. Recognizing the market opportunity on other high-value crops such as citrus, mango, rice, sweet potato, tropical fruits, and sugarcane, value adding technologies supported by industry demand will also be considered for funding to support the global competitiveness of the sector.

Call rationale

Rubber

According to the Association of Natural Rubber Producing Countries (ANRPC), the global consumption of rubber increased by 3.5% year-on-year. Moreover, the Persistence Market Research projected that the Rubber Industry will witness a CAGR of 5.8% during the period 2024 to 2031. The demand is expected to increase from USD 25.2 billion in 2024 to USD 37.5 billion USD by the end of 2031. Due to its low cost and versatility as lightweight material, natural rubber attracts demand across diverse sectors such as construction, pharmaceuticals, construction, etc.

Despite the demand, the rubber industry currently faces several issues. Last 19-21 November 2025, the Philippine Rubber Research Institute conducted the National Rubber Stakeholder Consultation and Updating of the Philippine Rubber Industry Roadmap 2023-2026. The downstream research and development topic needs were identified with emphasis on technologies to valorize rubber wastes and development of natural or synthetic elastomers that offer lower environmental impact to respond to the global shift towards green products and processes.

Call objective

The objective of this call is to foster technological advancement fit for Philippine high-value crops and commodities that are significant economic drivers. The resulting products or technologies should be low-cost, efficient, and robust to support countryside development and inclusive growth.

Call scope

The R&D proposal may include the following potential study areas:

1. Valorization of rubber waste, particularly from sources like spent tires and rubber products, aiming to turn waste into valuable materials through various processes
2. Develop new types of natural or synthetic elastomers that offer better performance or lower environmental impact

Specific Features Sought in this Call

Must result from industry consultations and address the specific needs outlined in the roadmap.

1. Must have a comprehensive review of existing literature, ensuring the proposal concept is not redundant with ongoing local research.
2. Must have a Technology Readiness Level (TRL) between 4 and 7, demonstrating technical feasibility through an established proof of concept. Proposals intending to establish proof of concept TRL 1-3 will not be prioritized.
3. Must consider both the supply chain for raw materials and the long-term viability of the finished product.
4. Must strongly engage key players across the value chain (ie. upstream, midstream, and downstream partners) is essential for the successful development and commercialization of a product or technology.

We define upstream as the source of raw materials or inputs; midstream refers to the stage where the product or service is manufactured or processed; and downstream represents the end-users who typically influence the product's performance, characteristics, and competitive pricing.

   a. Each partner's role should be clearly defined, specifying their responsibilities, contributions, and any counterpart funding that supports the project.
   b. A commitment letter from industry partners showing interest in the product's commercialization, ideally confirming their use of the resulting technology.

5. Must demonstrate a robust economic analysis to support the proposed product's financial sustainability.
6. The proposed budget for R&D should be commensurate with the market demand for innovation, product improvement, and the technologies being developed. It is crucial to allocate resources based on the expected impact and potential return on investment, ensuring that R&D efforts align with evolving consumer needs or market gaps.
7. For project leaders with on-going projects, updated reports for their respective projects should be submitted (i.e. technical progress and terminal and audited financial report). For completed projects, clearance from the funding agency from any obligations under the project.

PCIEERD will fund/endorse a maximum of 2 projects not to exceed Php35M budget covering all projects. The maximum duration for each project is 2 years.

Mining and Minerals Sector

Call Rationale

The Philippines is one of the world's most mineral-rich countries, with vast reserves of nickel, copper, gold, chromite, cobalt, rare earth elements (REEs), and other critical minerals. After more than a decade of delayed reforms, the mining sector is regaining momentum due to improved policy stability, modernized permitting, environmental oversight, and legislative reforms such as the PENCAS Law and RA 12253 (Enhanced Fiscal Regime for Large-Scale Metallic Mining Act).

This renewed stability coincides with rapidly increasing global demand for energy-transition and high-tech minerals, positioning the Philippines to play a major role in critical mineral supply chains for batteries, renewable energy, electric vehicles, and advanced manufacturing. Currently, the country exports mostly raw ores, capturing minimal downstream value.

Despite this potential, the mining sector faces challenges in sustainable resource use, environmental protection, occupational safety, and socio-economic impacts on mining communities. There is an urgent need for research, innovation, and technology development that ensures responsible extraction, processing, and utilization of minerals while contributing to industrialization, low-carbon transition, and inclusive growth.

This Call encourages initiatives that increase the economic value of minerals, reduce environmental impact, and promote social inclusiveness, helping the Philippines secure a competitive and sustainable position in the global minerals market.

Call Objectives

This Call aims to strengthen the Philippine mining sector by supporting research, innovation, and technology development that improve economic value, environmental sustainability, and social inclusiveness. Specifically, it seeks to:

1. Strengthen the Philippine mining sector by supporting research, innovation, and technology development that enhance economic value, promote environmental sustainability, and ensure social inclusiveness. It seeks to enhance the value of metallic minerals by developing technologies for the extraction and processing of critical metals, while also supporting innovations in metal product manufacturing.

2. Improve safety and efficiency in mining operations using advanced technologies.

3. Add value to non-metallic minerals through the development of technologies for industrial applications, including decarbonization. In addition, it seeks to support the extraction of critical minerals for emerging technologies by advancing offshore and onshore mineral exploration methods, improving resource assessment guidelines, innovating metallurgical processes for recovering high-value metals from ores, tailings, wastes, and unconventional sources.

4. Promotes sustainable mining and circular economy solutions by establishing circular value chains for small-scale mining communities, characterizing and repurposing mine wastes and tailings for industrial use, carbon storage, and supporting community-inclusive mine rehabilitation and environmental innovation to reduce ecological and social impacts.

5. Strengthen research and innovation capacity by enhancing the capabilities of Higher Education Institutions (HEIs), Research and Development Institutes (RDIs), and research teams in mining and mineral technology, while fostering collaboration across government, industry, and academia to align research with the country's goals for industrialization, low-carbon transition, and sustainable development.

Call Scope:

For the 2028 Call for Proposals (CFP), the research priority areas in the Mining and Minerals Sector are as follows:

A. VALUE-ADDING OF METALLIC MINERALS

1. Development of extraction and recovery methods for gold and associated metals from complex/low grade ores.
2. Development of technologies for the production of nickel metal products, including powder, briquettes, plates, and cathodes from nickel ores
3. Development of processing technologies for the production of high-grade ferronickel from nickel ores for use in stainless steel manufacturing.
4. Design, development, and validation of sensor-based systems for underground personnel tracking and safety management.
5. Development and implementation of advanced dust suppression technologies for mining operations.
6. Development of Automatic Draft Survey (ADS) systems for bulk ore carriers, enabling accurate, real-time measurement of ore cargo weight and distribution during shipping operations.

B. VALUE-ADDING OF NON-METALLIC MINERALS PROGRAM

1. Development of technologies utilizing limestone for decarbonization applications, including carbon capture, utilization, and storage (CCUS) and low-carbon industrial processes.
2. Development of technologies utilizing pyrite as a feedstock for sulfuric acid production.
3. Development of technologies utilizing lahar/volcanic ash as a sustainable source of silica for wafer and glass manufacturing.

C. EXTRACTION OF CRITICAL MINERALS FOR EMERGING TECHNOLOGY APPLICATION PROGRAM

Development of innovative methodologies and guidelines for offshore mineral reserve assessment, exploration, and extraction.

1. Development of advanced metallurgical processes for the extraction and recovery of high-value metals from mineral ores, tailings, wastes, (metal scrap from wrecked ship) and novel or unconventional sources for high tech of emerging technology applications, including the following:
   2.1 Recovery of rare earth elements (REEs) for permanent magnets used in wind turbines and electric vehicles;
   2.2 Recovery of copper, zinc, lead, silver, and gold from volcanic deposits (e.g., lava, lahar and ash deposits).
   2.3 Recovery of lithium and other metals from geothermal brines.
2. Development of technologies enabling the utilization of natural hydrogen for low-carbon and sustainable steelmaking.

TECHNOLOGIES IN SUPPORT OF MINE REHABILITATION PROGRAM

1. Establishment of a circular value chain for small scale mining industry.
2. Mine Waste Characterization and Valorization: Assessing Long-Term Feasibility for Carbon Storage, Phytomining in Mined-Out Areas, and Community-Integrated Waste Repurposing.
3. Development of technology to treat and utilize tailings for industrial applications.

The priorities outlined above are aligned with the updated Mining and Minerals Sector R&D Roadmaps, which were developed in consultation with DOST Mining and Minerals stakeholders through focus group discussions (FGDs), roundtable discussions (RTDs), workshops, surveys, and small group meetings in 2025.

Reminder: *Before submitting your proposal, please make sure to carefully review the* ***Specific Features Sought in this Call****, located at the end of the* ***Mining and Minerals Sector Call for Proposal*** *write-up. Ensuring your proposal aligns with these features is critical for eligibility and consideration.*

DETAILS OF RESEARCH PRIORITIES:

PROGRAM AREA: VALUE-ADDING OF METALLIC MINERALS PROGRAM

Research Priority: 1. Development of Extraction and Recovery Methods for Gold and Associated Metals Extraction from Complex and Low-Grade Ores

Call Rationale

The Philippines is richly endowed with gold resources. In 2023, the country's total gold reserves were estimated at approximately 3.69 million kilograms (Gold Reserves Volume in the Philippines, Christa Balita). In the same year, 12 primary producers generated a gold production value of approximately PhP 106.53 billion (Mines and Geosciences Bureau). Gold accounted for 38.21% of the total resource rent from the four major minerals, gold, copper, nickel, and chromite, amounting to PhP 57.66 billion, or 0.24% of the Gross Domestic Product (GDP) (Philippine Statistics Authority). These figures underscore the critical role of gold and its associated metals in the country's mineral sector and overall economy.

The Philippines hosts a diverse range of complex gold ore deposits, including epithermal lode, vein-type, and alkaline-type deposits. While these deposits represent substantial untapped potential, many remain underutilized due to the technical challenges associated with processing complex and low-grade ores. Given gold's significant contribution to national economic growth, there is a pressing need to develop advanced, high-recovery, and environmentally responsible processing technologies to sustain and enhance the sector's economic impact.

Complex gold ores are typically characterized by gold closely associated with other metals, such as copper, tellurium, bismuth, antimony, platinum group metals, silver, arsenic, and iron. The presence of these associated elements complicates extraction and necessitates advanced processing technologies to achieve high recovery rates. Moreover, the occurrence of arsenic, a toxic heavy metal, requires stringent environmental safeguards and compliance with environmental regulations, thereby increasing technical complexity and processing costs.

In response to these challenges, and in consultation with mining and minerals stakeholders, the Department of Science and Technology–Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD) has identified the development of advanced, high-recovery, and environmentally responsible technologies for processing complex and low-grade gold ores and their associated metals as a priority research area under this Call

Call Objective

To develop advanced, high-recovery, and environmentally responsible processing technologies for complex and low-grade gold ores and their associated metals, such as copper, tellurium, bismuth, antimony, and platinum group metals, ensuring a secure and sustainable supply, promoting resource efficiency, and supporting inclusive, long-term economic growth.

Call Scope:

The proposal should focus on the following:

1. Advanced extraction and beneficiation techniques for complex and low-grade gold ores and their associated metals.
2. Environmentally sound processing methods, including arsenic management.
3. Process optimization to improve recovery, efficiency, and sustainability.
4. Inclusion of a techno-economic analysis and/or feasibility study.
5. Validation of the developed technologies up to Technology Readiness Level (TRL) 3 through laboratory.

The proposal should clearly identify measurable outputs, including but not limited to:

1. Optimized process flow and operating parameters.
2. Demonstrated improvement in gold and associated metals recovery and processing efficiency.
3. Environmental impact assessment and mitigation strategies.
4. Cost–benefit analysis and/or techno-economic feasibility study.
5. Patent application, utility model, or other IP outputs (where applicable).
6. Comprehensive technical report and industry-ready recommendations.
7. Trained researchers and technical personnel.
8. Validation of the developed technologies up to Technology Readiness Level (TRL) 3 through laboratory demonstrations

Budget and Duration:

The maximum budget allocated for this research priority is Php 20,000,000.00, with a project duration of two (2) years, covering Calendar Years (CY) 2027–2028.

Research Priority: 2. Development of technologies for the production of nickel metal products, including powder, briquettes, plates, and cathodes from nickel ores

Call Rationale

Global demand for refined nickel metal products is increasing rapidly, driven by the accelerating growth of battery manufacturing, electric vehicles (EVs), renewable energy technologies, and advanced engineering applications. Nickel is a critical component in lithium-ion battery chemistries, particularly for high-nickel cathode materials used in EVs and energy storage systems, which require refined nickel products with high purity and consistent quality. As countries pursue decarbonization and energy transition strategies, demand for battery-grade and refined nickel metal is projected to grow significantly over the coming decades.

While the Philippines is one of the world's leading suppliers of nickel ore, the country's nickel industry remains largely focused on upstream activities, with limited domestic capacity for producing refined nickel metal products. This includes powders, briquettes, plates, and cathodes, which are key forms required for batteries, advanced alloys, and industrial applications, resulting in missed opportunities for downstream value addition and participation in higher-value segments of the global nickel supply chain.

The majority of Philippine nickel resources are lateritic and increasingly low-grade, which presents significant technical and economic challenges for conventional refining routes aimed at producing high-purity nickel metal. Laterite ores are characterized by complex mineralogy, high iron content, and variable composition, often requiring energy-intensive and capital-heavy

processing technologies to achieve acceptable metal recovery rates. These challenges are further compounded by local energy costs and environmental considerations, underscoring the need for processing technologies that are specifically adapted to Philippine operating conditions.

In response to these challenges, and following consultations with stakeholders from the mining, minerals processing, and manufacturing sectors, the Department of Science and Technology–Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD) has identified the development of technologies for the production of nickel metal products as a priority research area under this Call. Strengthening local capabilities in nickel metal processing is expected to promote industrial diversification, enhance domestic value addition, improve the utilization of low-grade nickel resources, and enable the Philippines to play a more active and strategic role in battery, EV, and energy-transition supply chains.

Call Objective

To develop technically viable, economically feasible, and environmentally responsible technologies for producing refined nickel metal products, including powder, briquettes, plates, and cathodes, from Philippine nickel ores, thereby enabling downstream processing, value addition, and integration into emerging high-value nickel markets.

Call Scope:

The proposals should focus on the development of nickel metal production technologies, including but not limited to the following:

1. Extraction and refining routes for producing high-purity nickel metal from lateritic or other nickel ores, particularly low-grade resources.
2. Processing and shaping of refined nickel into value-added forms such as the following:
    a. Nickel powder (fine particles) for batteries, catalysts, sintered parts
    b. Nickel briquettes for alloy making
    c. Nickel plates (flat sheets) for fabrication and plating
    d. Nickel cathodes (high purity electro-nickel) for battery, alloy, chemical industries
3. Process optimization to improve metal recovery, energy efficiency, product quality, and cost-effectiveness under local conditions.
4. Integration of environmentally responsible practices, including waste minimization, recycling, and by-product recovery.
5. Validation of the developed technologies up to Technology Readiness Level (TRL) 3 through laboratory scale testing.

Expected outputs should include validated laboratory scale nickel metal production technology (TRL 3), demonstrated production of nickel metal products meeting target specifications, optimized process flowsheets and operating parameters, environmental performance assessments, techno-economic analysis and/or feasibility study, intellectual property outputs (where applicable), comprehensive technical documentation, and trained researchers and technical personnel.

Budget and Duration

The maximum budget allocated for this research priority for the four (4) target technologies is Php 20,000,000.00 (Php 5,000,000.00 per technology), with a project duration of two (2) years, covering Calendar Years (CY) 2027–2028.

Research Priority: 3. Development of processing technologies for the production of high-grade ferronickel from nickel ores for use in stainless steel manufacturing

Call Rationale

Ferronickel is a critical alloying input in stainless steel production, a sector that continues to demonstrate strong and stable global demand due to its essential use in construction, automotive, appliances, and industrial machinery. As one of the world's leading suppliers of nickel ore, the Philippines plays a key role in supporting international stainless steel value chains. However, domestic production of high-grade ferronickel, whether in lump, pellets, or alloyed forms suitable for direct use in stainless steel manufacturing, remains limited, with much of the processing and value addition occurring overseas. This limits the country's participation in higher-value segments of the global nickel market and reduces opportunities for domestic industrial growth.

Producing ferronickel that meets the strict grade, chemical composition, and consistency requirements of stainless-steel manufacturers requires advanced processing technologies. Conventional ferronickel processing routes, including rotary kiln-electric furnace (RKEF) and smelting processes, are energy-intensive, capital-demanding, and may not be optimized for maximizing metal recovery, improving energy efficiency, and ensuring product quality. As stainless steel producers increasingly demand consistent, high-quality ferronickel, there is an urgent need for innovative processing technologies that enhance operational efficiency, reduce production costs, and improve overall process economics.

In response to these challenges, and based on consultations with stakeholders from mining, metallurgical, and stainless steel manufacturing sectors, the Department of Science and Technology - Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD) has identified the development of processing technologies for producing high-grade ferronickel as a priority research area under this Call. Strengthening domestic ferronickel processing capabilities will support value-added downstream integration into the stainless steel supply chain, improve industrial competitiveness, and reinforce the Philippines' position as a major supplier of high-quality ferronickel to global markets.

Call Objective

To develop efficient, cost-effective, and environmentally responsible processing technologies for producing high-grade ferronickel from Philippine nickel ores, supporting downstream integration into the stainless steel value chain and enhancing the long-term competitiveness of the Philippine nickel industry.

Call Scope

The proposal should focus on the development and improvement of ferronickel processing technologies, including but not limited to the following:

1. Processing and smelting routes for producing high-grade ferronickel from lateritic and other nickel ores, with emphasis on low-grade ore utilization.
2. Process innovations to improve nickel recovery, alloy grade, and consistency suitable for stainless steel manufacturing.
3. Optimization of energy use, reductant consumption, and operating parameters to improve economic feasibility under local conditions.

4. Integration of environmental management measures, including emissions reduction, slag utilization, and waste minimization.
5. Validation of the developed technologies up to Technology Readiness Level (TRL) 3 through laboratory.

Expected outputs should include a validated ferronickel production process or flowsheet (TRL 3), demonstrated production of ferronickel meeting target grade specifications, optimized operating parameters, environmental performance assessment, techno-economic analysis and/or feasibility study, intellectual property outputs (where applicable), comprehensive technical documentation, and trained researchers and technical personnel.

Budget and Duration:

The maximum budget allocated for this research priority is Php 10,000,000.00, with a project duration of two (2) years, covering Calendar Years (CY) 2027–2028.

Research Priority: 4. Design, development, and validation of sensor-based systems for underground personnel tracking and safety management

Call Rationale

Underground mining operations present significant occupational health and safety challenges due to confined spaces, complex tunnel networks, poor visibility, and exposure to hazards such as poor air quality, ground instability, flooding, and equipment-related accidents. Ensuring the safety and real-time monitoring of underground personnel is a critical concern for mining companies, regulators, and workers alike.

Currently, many underground mining operations in the Philippines rely on manual monitoring, basic radio communication, or limited-location tracking systems. These approaches are often inadequate for accurately tracking personnel, monitoring environmental conditions, and enabling rapid response during emergencies such as cave-ins, gas leaks, fires, or flooding. The absence of real-time monitoring can result in delayed rescue operations, higher risk of injuries, and reduced operational efficiency.

Advances in sensor technologies, wireless communications, Internet of Things (IoT), and data analytics provide opportunities to improve underground mine safety. Sensor-based personnel tracking systems integrating wearable devices, environmental sensors, and centralized monitoring platforms can provide real-time visibility of worker movement, detect environmental hazards, and facilitate timely emergency responses. Such systems enhance proactive risk management, compliance with occupational safety regulations, and overall operational safety.

However, underground mining environments pose unique technical challenges, including signal attenuation, power limitations, harsh conditions, and system interoperability. Hence, there is a pressing need to design, develop, and validate robust, cost-effective, and locally adaptable sensor-based systems tailored to underground mining operations in the Philippines.

In response, and in consultation with mining and minerals stakeholders, the DOST-PCIEERD has identified this research priority to strengthen mine safety, enhance emergency preparedness, and support the adoption of smart and responsible mining practices.

Call Objective:

To develop, test, and validate sensor-based systems for underground personnel tracking and safety management that provide real-time monitoring, enhance emergency response, and improve overall occupational safety in Philippine underground mining operations.

Call Scope:

The proposal should cover, but are not limited to, the following areas:

1. Design and development of wearable devices and environmental sensors suitable for underground mining conditions,
2. Integration of sensor networks, wireless communication protocols, and IoT platforms for real-time personnel tracking,
3. Development of centralized monitoring systems for safety management, including dashboards, alerts, and reporting tools,
4. System validation and testing in laboratory and simulated underground conditions,
5. Data analytics and predictive safety tools for hazard detection, incident prevention, and emergency response optimization and
6. Compliance with Philippine occupational health and safety standards (DOLE, DENR, Mine Safety Guidelines).

The proposal is expected to deliver the following outputs: (1) prototype sensor-based personnel tracking system for underground operations, (2) laboratory-scale and/or pilot-scale validation results demonstrating functionality and reliability, (3) integration framework for real-time data acquisition, monitoring, and alert systems, (4) environmental and operational resilience assessment for underground conditions, (5) technical documentation, including system architecture, user manuals, and standard operating procedures (SOPs), (6) cost–benefit analysis and feasibility study demonstrating scalability and sustainability, (7) intellectual property outputs, including patents, utility models, or proprietary technology (where applicable) and (8) capacity-building outcomes, including trained personnel and researchers in mining safety technologies

Budget and Duration:

The maximum budget allocated for this research priority is Php 5,000,000.00, with a project duration of two (2) years, covering Calendar Years (CY) 2027–2028.

Research Priority 5: Development and implementation of advanced dust suppression technologies for mining operations

Call Rationale:

Mining operations, particularly open-pit and underground extraction, generate significant quantities of dust, which poses serious health, environmental, and operational risks. Prolonged exposure to respirable dust, including silica and particulate matter, can cause respiratory diseases such as silicosis, chronic obstructive pulmonary disease (COPD), and other health complications. Dust emissions also degrade air quality, reduce visibility, increase machinery wear, and contribute to environmental pollution in surrounding communities.

Current dust control measures in Philippine mining operations, such as water spraying, chemical suppressants, and ventilation systems, are often limited in effectiveness, expensive to maintain, or insufficiently adapted to local conditions. The lack of advanced, cost-effective,

and environmentally sustainable dust suppression technologies continues to pose challenges to occupational safety, regulatory compliance, and environmental protection.

Recent advances in nanomaterials, aerosol dynamics, smart sensors, and automated spraying systems provide opportunities to develop next-generation dust suppression solutions. These technologies can minimize airborne particulate concentrations, optimize water and chemical usage, and enable real-time monitoring of dust levels. By implementing such solutions, mining operations can enhance worker safety, improve operational efficiency, and meet environmental compliance standards.

In response, and in consultation with mining stakeholders, the DOST-PCIEERD has identified the development and implementation of advanced dust suppression technologies as a priority research area. This initiative aims to protect miner health, reduce environmental impact, and promote sustainable and responsible mining practices in the Philippines.

Call Objective

To develop, implement, and validate advanced dust suppression technologies that effectively reduce airborne particulate matter in mining operations, enhance worker health and safety, and ensure compliance with environmental regulations.

Call Scope

The proposal should focus on, but are not limited to, the following:

1. Design and development of advanced dust suppression systems for open-pit and underground mines,
2. Implementation of smart and automated spraying systems using water, chemical suppressants, or nanotechnology-based solutions,
3. Integration with dust sensors and monitoring platforms for real-time control and optimization,
4. Testing and validation of dust suppression technologies in laboratory and operational mining conditions,
5. Reduction of water and chemical consumption while maintaining effective dust control
6. Valuation of environmental, operational, and health impacts of the developed technology and
7. Compliance with Philippine environmental and occupational health standards (DENR, DOLE-OSH, MGB regulations).

The proposal should deliver the following: (1) prototype or pilot-scale advanced dust suppression technology suitable for mining operations, (2) laboratory and/or field validation results demonstrating dust reduction efficiency, (3) integration with real-time monitoring systems for dust levels and environmental conditions, (4) operational guidelines, maintenance protocols, and standard operating procedures (SOPs), (5) cost-benefit analysis and feasibility study, including potential for large-scale adoption, (6) technical documentation, including design specifications, user manuals, and safety protocols, (7) intellectual property outputs, including patents or utility models (where applicable) and (8) capacity-building outcomes, including trained personnel in dust management and technology implementation.

Budget and Duration:

The maximum budget allocated for this research priority is Php 5,000,000.00, with a project duration of two (2) years, covering Calendar Years (CY) 2027–2028.

Research Priority: 6. Development of Automatic Draft Survey (ADS) systems for bulk ore carriers, enabling accurate, real-time measurement of ore cargo weight and distribution during shipping operations

Call Rationale

Accurate measurement of bulk mineral ore cargo weight and distribution is critical for safe, efficient, and compliant shipping operations in the mining sector. Traditional draft survey methods, which rely on manual measurements and calculations, are labor-intensive, time-consuming, and prone to human error. Inaccuracies in cargo weight and distribution can lead to operational inefficiencies, non-compliance with maritime regulations, and safety hazards, including vessel instability or overloading.

With the increasing volume of mineral ore exports from the Philippines, there is a pressing need for advanced, automated solutions that provide real-time, reliable measurements of cargo weight and distribution during shipping. Automatic Draft Survey (ADS) systems offer the potential to modernize bulk ore transport by integrating sensors, data analytics, and real-time monitoring, enhancing operational efficiency, maritime safety, and regulatory compliance.

In consultation with the DOST-PCIEERD Mining and Minerals Stakeholders, the development of ADS systems for mineral ore carriers has been identified as a priority research area to support the modernization and digitization of mineral logistics and transport operations in the Philippines.

Call Objective:

To develop Automatic Draft Survey (ADS) systems for bulk mineral ore carriers that provide accurate, real-time measurement of cargo weight and distribution, enhancing operational efficiency, maritime safety, and regulatory compliance in mining-related shipping operations.

Call Scope:

The proposal should focus on the following:

1. Design and development of ADS systems for bulk mineral ore carriers, incorporating sensors, software, and data analytics for real-time cargo measurement and monitoring.
2. Integration with existing shipboard and mining logistics systems for automated data collection, processing, and reporting.
3. Validation of system accuracy and reliability under operational conditions during the transport of mineral ores.
4. Optimization of data acquisition, processing, and visualization to support decision-making for cargo loading, stability management, and regulatory compliance.
5. Assessment of operational, economic, and regulatory impacts, including improvements in safety, efficiency, and cost-effectiveness.

Expected measurable outputs include: Prototype ADS system validated under real-world mineral ore transport conditions, demonstrated accuracy in cargo weight and distribution measurements, software and data analytics platform for real-time monitoring and reporting, technical guidelines and standard operating procedures for ADS implementation in mining

logistics, techno-economic feasibility study supporting scalability and industry adoption, intellectual property outputs (patents, utility models) where applicable and trained technical personnel for system deployment and operation

Budget and Duration:

The maximum budget allocated for this research priority is Php 5,000,000.00, with a project duration of two (2) years, covering Calendar Years (CY) 2027–2028.

PROGRAM AREA: VALUE-ADDING OF NON-METALLIC MINERALS

Research Priority: 1. Development of technologies utilizing limestone for decarbonization applications, including carbon capture, utilization, and storage (CCUS) and low-carbon industrial processes

Call Rationale

Limestone ($CaCO_3$) is one of the most abundant non-metallic minerals in the Philippines, with widespread applications in construction, cement manufacturing, agriculture, and soil management. Beyond its conventional uses, limestone has significant potential as a material for decarbonization technologies, including carbon capture, utilization, and storage (CCUS), and for enabling low-carbon industrial processes. The rising global focus on reducing greenhouse gas emissions and achieving net-zero targets has created a demand for innovative solutions that integrate limestone into environmentally responsible and sustainable technologies.

Despite its availability, utilization of Philippine limestone for advanced decarbonization applications remains largely unexplored. Developing processes that convert limestone into materials for CCUS, low-carbon lime production, or soil amendment can provide substantial environmental and economic benefits. This includes supporting agricultural productivity and soil management, reducing reliance on imported limestone and neutralizing agents, enabling the development of low-carbon lime production technologies, and creating localized livelihood and community-scale production opportunities.

In response to these opportunities and following consultations with industry, academic, and research stakeholders, the Department of Science and Technology–Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD) has identified the development of technologies utilizing limestone for decarbonization applications as a priority research area under this Call. Strengthening domestic capabilities in this sector will contribute to national climate goals, enhance the sustainability of industrial processes, and position the Philippines as a competitive player in the global low-carbon technology market.

Call Objective:

To develop technically viable, economically feasible, and environmentally responsible technologies that utilize limestone for decarbonization applications, including carbon capture, utilization, and storage (CCUS), and to integrate limestone-based solutions into low-carbon industrial processes, thereby contributing to emission reductions and sustainable industrial development.

Call Scope:

The proposal should include, but are not limited to, the following:

1. Development and optimization of limestone-based materials for carbon capture, including sorbents, absorbents, and other functional derivatives.
2. Processes for utilizing limestone in carbon utilization pathways, such as mineralization, conversion into value-added products, or incorporation into industrial processes.
3. Integration of limestone-based technologies into low-carbon industrial processes, such as cement, lime, or chemical production, to reduce CO_2 emissions.
4. Environmental impact assessment, including life-cycle analysis and evaluation of CO_2 reduction potential.
5. Validation of developed technologies up to Technology Readiness Level (TRL) 3, through laboratory demonstrations.

Expected outputs should include validated laboratory limestone-based decarbonization technology (TRL 3), demonstrated CO_2 capture or utilization efficiency, optimized process parameters, environmental impact assessments, techno-economic feasibility study, intellectual property outputs (if applicable), comprehensive technical documentation, and trained researchers and technical personnel.

Budget and Duration

The maximum budget allocated for this research priority is Php 10,000,000.00, with a project duration of two (2) years, covering Calendar Years (CY) 2027–2028.

Research Priority: 2. Development of technologies utilizing pyrite as a feedstock for sulfuric acid production

Call Rationale:

Pyrite (FeS_2), commonly known as “fool’s gold,” is an abundant non-metallic mineral in the Philippines, often associated with base metal deposits. It is a valuable source of sulfur, which can be converted into sulfuric acid a critical industrial chemical used in fertilizers, mineral processing, metal refining (particularly nickel), chemical manufacturing, and battery material production (USGS, 2023). Globally, sulfuric acid demand continues to rise due to its essential role in agriculture and industrial processes, making locally sustainable production highly strategic.

Currently, much of the sulfuric acid used in the Philippines is imported or derived from conventional sulfur sources, limiting domestic industrial value addition. Utilizing pyrite as a feedstock provides an opportunity to produce sulfuric acid domestically, reducing supply risks, lowering operating costs for mining companies, and improving utilization of complex ores and mining by-products. Moreover, pyrite-based sulfuric acid production supports circular and integrated mineral processing, turning mining residues into valuable industrial inputs while promoting environmental sustainability.

In response to these opportunities, and following consultations with stakeholders from mining, chemical, and industrial sectors, the Department of Science and Technology–Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD) has identified the development of technologies utilizing pyrite for sulfuric acid production as a priority research area under this Call. Strengthening domestic pyrite-based sulfuric acid production capabilities will enhance industrial competitiveness, support the

downstream processing of nickel and other minerals, and foster a more resilient and sustainable local chemical industry.

Call Objective:

To develop technically viable, economically feasible, and environmentally responsible technologies for producing sulfuric acid from pyrite feedstock, thereby enabling local value addition, improving industrial self-sufficiency, and supporting sustainable chemical production.

Call Scope:

The proposal should include, but are not limited to, the following:

1. Development and optimization of pyrite roasting, leaching, or other processing routes for efficient sulfur extraction.
2. Conversion of extracted sulfur into high-purity sulfuric acid suitable for industrial applications.
3. Process optimization to enhance sulfur recovery, energy efficiency, and overall economic viability.
4. Integration of environmental management measures, including emissions control, acid mist capture, and waste minimization.
5. Validation of developed technologies up to Technology Readiness Level (TRL) 3, through laboratory scale demonstrations.

Expected outputs should include validated laboratory scale pyrite-to-sulfuric-acid technology (TRL 3), demonstrated product quality meeting industrial specifications, optimized process parameters, environmental impact assessments, techno-economic analysis or feasibility study, intellectual property outputs (where applicable), comprehensive technical documentation, and trained researchers and technical personnel.

Budget and Duration:

The maximum budget allocated for this research priority is Php 10,000,000.00, with a project duration of two (2) years, covering Calendar Years (CY) 2027–2028.

Research Priority: 3. Development of technologies utilizing lahar/volcanic ash as a sustainable source of silica for wafer and glass manufacturing

Call Rationale

Silica (SiO_2) is a critical industrial mineral used in glass, ceramics, silicon wafers, electronics, and other advanced materials. The Philippines, as a volcanically active country, has abundant deposits of lahar and volcanic ash, which are naturally rich in silica. These deposits are often underutilized, with most industrial-grade silica being imported from overseas, limiting domestic value addition and industrial competitiveness.

Developing technologies to extract high-purity silica from lahar and volcanic ash can convert abundant volcanic materials into value-added products for the glass, electronics, and semiconductor industries. Utilizing these resources locally reduces dependence on imported silica, promotes circular economy practices by valorizing volcanic deposits, and supports sustainable industrial development. Advanced processing of lahar-derived silica also opens opportunities for high-tech applications, including wafer fabrication for semiconductors, specialty glass production, and silica-based functional materials, thereby enhancing the competitiveness of Philippine manufacturing in global high-value markets.

In response to these opportunities, and following consultations with stakeholders from mining, materials science, and glass and semiconductor manufacturing sectors, the Department of Science and Technology–Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD) has identified the development of technologies for producing industrial-grade silica from lahar/volcanic ash as a priority research area under this Call. Strengthening domestic capabilities in this area will support sustainable industrial growth, reduce import dependence, enhance local value addition, and position the Philippines as a competitive supplier of silica for high-value applications.

Call Objective

To develop technically viable, economically feasible, and environmentally responsible technologies for producing high-purity silica from lahar/volcanic ash, suitable for glass manufacturing, semiconductor wafer production, and other industrial applications, thereby promoting sustainable mineral utilization and local value addition.

Call Scope

The proposal should include, but are not limited to, the following:

1. Development of beneficiation, purification, and processing technologies for extracting high-purity silica from lahar and volcanic ash.
2. Optimization of chemical and thermal processes to produce silica suitable for glass, wafer, or specialty industrial applications.
3. Evaluation of material properties and suitability for industrial standards, including purity, particle size, and crystallinity.
4. Environmental impact assessment, including mitigation of dust, particulate emissions, and waste by-products.
5. Validation of developed technologies up to Technology Readiness Level (TRL) 3, through laboratory scale demonstrations.

Expected outputs may include validated laboratory scale silica production technology (TRL 3), demonstration of silica meeting industrial specifications, optimized processing parameters, environmental impact assessment, techno-economic feasibility study, intellectual property outputs (if applicable), comprehensive technical documentation, and trained researchers and technical personnel.

Budget and Duration:

The maximum budget allocated for this research priority is Php 10,000,000.00, with a project duration of two (2) years, covering Calendar Years (CY) 2027–2028.

PROGRAM AREA: CRITICAL MINERALS FOR EMERGING TECHNOLOGY APPLICATION PROGRAM

Research Priority: 1. Development of Innovative Methodologies and Guidelines for Offshore Mineral Reserve Assessment, Exploration, and Extraction

Call Rationale

The Philippines is an archipelagic nation with an extensive exclusive economic zone (EEZ) and vast offshore areas that remain largely underexplored for mineral resources, despite

increasing domestic and global demand for metals critical to infrastructure, clean energy, and advanced manufacturing. As onshore mineral resources face declining grades, land-use conflicts, environmental constraints, and social acceptability issues, offshore mineral resources such as marine placer deposits, seabed massive sulfides, and offshore aggregates represent a strategic but underdeveloped resource base.

However, the assessment, exploration, and extraction of offshore mineral resources pose distinct technical, environmental, and regulatory challenges that cannot be adequately addressed using conventional onshore mining methodologies. These include complex seabed geologies, dynamic oceanographic conditions, limited baseline environmental data, and heightened risks to sensitive marine ecosystems and coastal livelihoods. The absence of locally adapted, science-based methodologies and clear operational guidelines creates uncertainty for regulators, researchers, and industry, constraining responsible investment and effective governance.

Developing innovative, integrated methodologies combining geophysical and geochemical surveying, marine robotics, remote sensing, and data-driven resource modeling together with comprehensive national guidelines for offshore mineral reserve assessment, exploration, and extraction is therefore essential. Such frameworks will enable accurate resource quantification, risk-informed decision-making, environmental protection, and regulatory clarity, while ensuring alignment with international best practices and the Philippines' commitments to sustainable development, marine conservation, and climate resilience.

Establishing these methodologies and guidelines will support responsible offshore mineral development, strengthen national mineral security, reduce reliance on imported raw materials, and position the Philippines to strategically and sustainably harness offshore mineral resources as part of a future-ready mining and minerals policy.

Call Objective

To develop innovative methodologies and guidelines for offshore mineral reserve assessment, exploration, and extraction.

Call Scope

The proposal should include, but are not limited to, the following:

1. Development of integrated offshore mineral assessment and exploration methodologies, including marine geophysical and geochemical surveying, seabed sampling, and resource modeling, to accurately identify and quantify offshore mineral reserves within the Philippine maritime zones in accordance with UNCLOS.
2. Optimization of offshore exploration and extraction approaches, including the use of remote and autonomous marine technologies, to improve operational efficiency, safety, and data reliability under varying seabed and oceanographic conditions.
3. Evaluation of geological, geotechnical, and environmental parameters relevant to offshore mineral development, including deposit characteristics, seabed stability, sediment dynamics, and baseline marine environmental conditions.
4. Assessment of environmental and socio-economic impacts, including potential effects on marine ecosystems, fisheries, coastal communities, and cumulative impacts, together with the development of mitigation and monitoring strategies consistent with ecosystem-based and precautionary approaches.

5. Formulation and validation of technical and regulatory guidelines for offshore mineral reserve assessment, exploration, and extraction, aligned with existing draft offshore mining frameworks, UNCLOS obligations, and national regulatory requirements.
6. Validation of developed methodologies and guidelines up to Technology Readiness Level (TRL) 3–4, through laboratory-scale studies, numerical modeling, and controlled field or pilot demonstrations using representative offshore datasets.

Expected outputs include validated offshore mineral assessment, exploration, and extraction methodologies up to TRL 3–4; quantified offshore mineral resource estimates; and science-based technical and regulatory guidelines aligned with existing draft offshore mining frameworks, UNCLOS, and national regulations. Additional outputs include baseline environmental and socio-economic impact assessments, a techno-economic feasibility analysis, comprehensive technical documentation, potential intellectual property outputs, and trained researchers and technical personnel.

Budget and Duration

The maximum budget allotted for the above research is Php 40,000,000.00 with a duration of two (2) years covering Calendar Years (CY) 2027–2028.

Research Priority: 2. Development of advanced metallurgical processes for the extraction and recovery of high-value metals from mineral ores, tailings, wastes, (metal scrap from wrecked ship) and novel or unconventional sources for high tech of emerging technology applications

Rapid growth in high-tech and emerging technologies is driving strong demand for high-value and critical metals, while traditional primary mineral sources are increasingly constrained by declining ore grades, environmental impacts, and social acceptability. At the same time, significant quantities of valuable metals remain locked in low-grade ores, mine tailings, industrial wastes, and secondary materials, including metal scrap from wrecked ships and other unconventional sources.

The development of advanced metallurgical processes to efficiently extract and recover these metals is therefore essential to enhance resource efficiency, reduce environmental liabilities, and strengthen supply chain security. Such innovations enable the production of industrial-grade metals for emerging technology applications, support circular economy and sustainable mining objectives, and reduce dependence on imported raw materials

2.1 Recovery of rare earth elements (REEs) for permanent magnets used in wind turbines and electric vehicles

Call Rationale

The demand for clean energy technologies is rising rapidly, with rare earth elements (REEs) playing a crucial role as key materials that enable this transition. REEs are essential for a wide range of high-value applications, yet global upstream supply remains highly vulnerable to disruption due to heavy dependence on China for both mining and processing, alongside limited capacity in other regions. As a result, countries are competing to secure reliable access to REEs, with projected demand expected to exceed supply and exert upward pressure on prices.

In the Philippines, wind turbines play an important role in advancing the country's clean energy transition by supporting energy security, climate resilience, and sustainable development. As an archipelagic nation highly vulnerable to climate change and heavily dependent on imported fossil fuels, the Philippines benefits from wind energy as a domestic, renewable, and low-carbon power source. The country has significant wind resources, particularly in coastal areas, mountain ridges, and northern and central regions, which can be harnessed to diversify the energy mix and reduce greenhouse gas emissions. Expanding wind power generation helps lower electricity costs in the long term, reduces exposure to volatile fuel prices, and supports national renewable energy targets under the Philippine Energy Plan and climate commitments. Moreover, the deployment of wind turbines contributes to rural development, job creation, and improved grid stability when combined with other renewable sources, making wind energy a strategic component of the Philippines' transition toward a cleaner and more resilient energy system.

Electric vehicles (EVs) play a vital role in the clean energy transition by reducing dependence on fossil fuels and significantly lowering greenhouse gas emissions from the transport sector, which is one of the largest contributors to air pollution and carbon emissions. By replacing internal combustion engine vehicles with EVs powered by electricity, especially when coupled with renewable energy sources, overall energy efficiency is improved, and emissions are reduced across the vehicle lifecycle. EVs also support energy system flexibility through smart charging and potential vehicle-to-grid applications, helping integrate variable renewable energy such as wind and solar. As EV adoption expands, it contributes to cleaner air, reduced fuel import dependence, and the development of sustainable, low-carbon transport systems essential for achieving long-term climate and energy goals. There has been a dramatic increase in global demand for electric vehicles, with EV sales growing rapidly year-over-year. In the Philippines, EV demand has been rising sharply from a relatively low base.

Call Objective

To develop innovative, technically viable, economically feasible, and environmentally responsible metallurgical processes to extract and recover industrial-grade rare earth elements (REEs) for permanent magnets used in wind turbines and electric vehicles.

Call Scope:

The proposal should include, but are not limited to, the following:

1. Development of beneficiation, purification, and processing technologies for extracting and recovery of industrial-grade rare earth elements (REEs) for permanent magnets used in wind turbines and electric vehicles.
2. Optimization of metallurgical processes to produce REEs suitable for wind turbines and electric vehicles for industrial applications.
3. Evaluation of material properties and suitability for industrial standards, including purity, particle size, and crystallinity.
4. Environmental impact assessment, including mitigation of contaminants, particulate emissions, and waste by-products.
5. Validation of developed technologies up to Technology Readiness Level (TRL) 4, through laboratory pilot-scale demonstrations.

Expected outputs should include validated laboratory to pilot-scale REE production technology (TRL 4), demonstration of REE recovery meeting industrial specifications, optimized processing parameters, environmental impact assessment, techno-economic feasibility study, intellectual property outputs (if applicable), comprehensive technical documentation, and trained researchers and technical personnel.

Budget and Duration:

The maximum budget allocated for this research priority is Php 20,000,000.00, with a project duration of two (2) years, covering Calendar Years (CY) 2027–2028.

2.2 Recovery of copper, zinc, lead, silver, and gold from volcanic deposits (e.g., lava, lahar and ash deposits).

Call Rationale

Copper, zinc, lead, silver, and gold are vital to the Philippines for industrial, technological, and clean energy development. Copper supports electrification and renewable energy infrastructure, zinc and lead are key for batteries and industrial applications, silver is critical for electronics and photovoltaics, and gold serves both high-tech uses and economic value. Recovering these metals domestically reduces import dependence, strengthens industrial capacity, and maximizes the country's mineral resources.

The recovery of copper, zinc, lead, silver, and gold from volcanic deposits, such as lava flows, lahar, and ash, is strategically important for the Philippines due to the country's location which hosts extensive volcanic terrains rich in metallic elements. in In the Philippines there are vast unutilized lava, lahar, and ash deposits, particularly in volcanic regions. Many of these deposits are remnants of past eruptions and lahars that were never mined because conventional operations focused on higher-grade primary ores. While traditional mining has focused on high-grade veins and porphyry deposits, significant quantities of metals remain dispersed in secondary volcanic materials that are often overlooked or treated as waste. These metals are critical for industrial and technological applications, including electrification, renewable energy systems, battery technologies, electronics, and high-value manufacturing.

Advanced metallurgical processes, such as hydrometallurgy, selective flotation, and bioleaching, now make it feasible to extract metals from these complex matrices, producing industrial-grade materials suitable for downstream use. Recovering metals from lava, lahar, and ash not only maximizes resource utilization and reduces reliance on imported strategic metals but also supports sustainable mining practices, minimizes environmental impact, and strengthens the domestic mineral value chain, positioning the Philippines as a key player in clean energy and high-tech industries.

Call Objective:

To develop innovative technically viable, economically feasible, and environmentally responsible metallurgical processes to extract and recover industrial-grade copper, zinc, lead, silver, and gold from volcanic deposits (e.g., lava, lahar and ash deposits).

Call Scope:

Proposed projects may include, but are not limited to, the following:

1. Development of beneficiation, purification, and processing technologies for extracting and recovery of industrial-grade copper, zinc, lead, silver, and gold from volcanic deposits (e.g., lava, lahar and ash deposits).
2. Optimization of metallurgical processes to recover industrial-grade copper, zinc, lead, silver, and gold from volcanic deposits (e.g., lava, lahar and ash deposits).

3. Evaluation of material properties and suitability for industrial standards, including purity, particle size, and crystallinity.
4. Environmental impact assessment, including mitigation of contaminants, particulate emissions, and waste by-products.
5. Validation of developed technologies up to Technology Readiness Level (TRL) 4, through laboratory- or pilot-scale demonstrations.

Expected outputs may include validated laboratory- or pilot-scale recovery of industrial-grade copper, zinc, lead, silver, and gold from volcanic deposits (e.g., lava, lahar and ash deposits) technology (TRL 4), demonstration of the above metal recovery meeting industrial specifications, optimized processing parameters, environmental impact assessment, techno-economic feasibility study, intellectual property outputs (if applicable), comprehensive technical documentation, and trained researchers and technical personnel.

Budget and Duration:

The maximum budget allocated for this research priority is Php 20,000,000.00, with a project duration of two (2) years, covering Calendar Years (CY) 2027–2028.

2.3 Recovery of lithium and other metals from geothermal brines.

Call Rationale:

The Philippines is home to several significant geothermal sites, making it the third largest producer of geothermal energy in the world, with major geothermal power plants located across Luzon, Visayas, and Mindanao. These systems circulate deep, metal-bearing fluids through volcanic and magmatic rocks, creating brines that may contain economically recoverable concentrations of lithium and other strategic elements.

The need for lithium is driven by its central role in energy transition and modern technologies. Lithium is a critical component of lithium-ion batteries, which power electric vehicles (EVs), grid-scale energy storage systems, and portable electronics, making it essential for reducing greenhouse gas emissions and supporting renewable energy integration. Other metals, include rare earth elements (REEs) are also critical to the clean energy transition.

The need to explore geothermal brines arises from the growing demand for lithium, rare earth elements (REEs), and other critical metals for clean energy, electric vehicles, energy storage, and advanced technologies. Geothermal brines represent a domestic, renewable, and low-carbon source of these metals that are often present as by-products in the high-temperature fluids circulating in volcanic and magmatic systems. Recovering metals from brines allows the Philippines to diversify supply sources, reduce reliance on imported raw materials, and maximize the value of existing geothermal resources without additional mining impacts.

Call Objective:

To develop innovative technically viable, economically feasible, and environmentally responsible metallurgical processes to extract and recover industrial-grade lithium and other metals (e.g., rare earth elements) from geothermal brines.

Call Scope

The proposal should include, but are not limited to, the following:

1. Development of beneficiation, purification, and processing technologies for extracting and recovery of industrial-grade lithium and other metals from geothermal brines.
2. Optimization of metallurgical processes to produce industrial-grade lithium and other metals from geothermal brines.
3. Evaluation of material properties and suitability for industrial standards, including purity, particle size, and crystallinity.
4. Environmental impact assessment, including mitigation of contaminants, particulate emissions, and waste by-products.
5. Validation of developed technologies up to Technology Readiness Level (TRL) 4, through laboratory to pilot-scale demonstrations.

Expected outputs should include validated laboratory to pilot-scale production of industrial-grade lithium and other metals from geothermal brines with technology (TRL 4), demonstration of the above metal recovery meeting industrial specifications, optimized processing parameters, environmental impact assessment, techno-economic feasibility study, intellectual property outputs (if applicable), comprehensive technical documentation, and trained researchers and technical personnel.

Budget and Duration:

The maximum budget allocated for this research priority is Php 20,000,000.00, with a project duration of two (2) years, covering Calendar Years (CY) 2027–2028.

Research Priority: 3. Development of technologies enabling the utilization of natural hydrogen for low-carbon and sustainable steelmaking

Call Rationale:

The need for low-carbon and sustainable steelmaking arises from the steel industry's significant contribution to global greenhouse gas emissions, with traditional production methods relying heavily on coal and coke as reducing agents. As demand for steel grows to support infrastructure, transportation, and clean energy technologies, reducing the carbon footprint of steel production has become essential to meet climate targets, environmental regulations, and sustainability commitments.

Transitioning to low-carbon technologies would allow the Philippine steel industry to modernize production, reduce reliance on imported low-carbon steel, improve energy efficiency, and create a competitive edge in a global market increasingly focused on environmentally responsible steel products.

Using natural hydrogen lies in its potential to serve as a clean, zero-carbon reducing agent in industrial processes, particularly in steelmaking and other metallurgical applications. Unlike fossil fuels, natural hydrogen produces water rather than CO_2 when oxidized, offering a pathway to drastically reduce greenhouse gas emissions. It is also a domestic, naturally occurring resource in certain geological formations, which can complement renewable energy initiatives and reduce dependence on imported hydrogen or fossil fuels.

Utilizing natural hydrogen leverages an underexplored energy and metallurgical resource, enabling the development of low-carbon, sustainable industrial processes, enhancing national energy security, and fostering technological innovation in clean energy and advanced manufacturing sectors. For the Philippines, tapping natural hydrogen can support a transition

to sustainable steelmaking and other high-temperature industrial applications, contributing to both economic competitiveness and climate goals.

Call Objective:

To develop innovative, technically viable, economically feasible, and environmentally responsible technologies for the utilization of natural hydrogen for low-carbon and sustainable steelmaking.

Call Scope:

The proposal should include, but are not limited to, the following:

1. Development of low-carbon and sustainable steelmaking with the application of natural hydrogen.
2. Optimization of steelmaking processes using natural hydrogen to produce industrial-grade steel.
3. Evaluation of material properties and suitability for industrial standards, raw material quality, process control, chemical composition, mechanical performance, dimensional tolerances, environmental compliance, occupational safety requirements.
4. Environmental impact assessment, including mitigation of contaminants, particulate emissions, and waste by-products.
5. Validation of developed technologies up to Technology Readiness Level (TRL) 4, through laboratory to pilot-scale demonstrations.

Expected outputs should include validated laboratory to pilot-scale steelmaking production technology (TRL 4), demonstration of steelmaking using natural hydrogen meeting industrial specifications, optimized processing parameters, environmental impact assessment, techno-economic feasibility study, intellectual property outputs (if applicable), comprehensive technical documentation, and trained researchers and technical personnel.

Budget and Duration

The maximum budget allocated for this research priority is Php 20,000,000.00, with a project duration of two (2) years, covering Calendar Years (CY) 2027–2028.

PROGRAM AREA: TECHNOLOGIES IN SUPPORT TO ENVIRONMENTAL PROTECTION, CONSERVATION AND REHABILITATION OF MINED-OUT AREA

Research Priority: 1. Establishment of a circular value chain for small scale mining industry

Call Rationale

Small-scale mining plays a significant role in local economies but often operates with limited access to technology, resulting in low resource efficiency and the generation of unmanaged wastes and by-products. These inefficiencies limit the economic benefits that could otherwise be derived from mineral resources. The application of circular economy principles offers an opportunity to improve resource utilization, reduce environmental impacts, and create additional value streams within the small-scale mining sector.

This research priority addresses the need for technology-based solutions that enable the recovery, reuse, and recycling of materials across the small-scale mining value chain.

Establishing a circular value chain can support environmental protection, improve productivity, and enhance livelihood opportunities in mining communities while promoting responsible and sustainable mining practices.

In consultation with the DOST-PCIEERD Mining and Minerals Stakeholders, the establishment of a circular value chain for the small-scale mining industry has been identified as a priority research and development area to promote sustainable growth, responsible resource management, and inclusive economic development.

Call Objective

To establish a circular value chain for the small-scale mining industry that maximizes resource efficiency, minimizes environmental impact, and enhances economic returns, while supporting the adoption of sustainable and socially responsible mining practices

Call Scope

The proposal under this research priority should include, but are not limited to the following:

Development of technologies and processes for waste reduction, recovery of valuable by-products, and recycling within small-scale mining operations.

1. Integration of circular economy principles into existing SSM practices, including beneficiation, processing, and logistics.
2. Assessment of environmental and social impacts, ensuring compliance with regulations and promoting safe, sustainable mining.
3. Development of business models and value chain frameworks that enhance profitability, market access, and community benefits.
4. Capacity-building and training programs for small-scale miners in circular economy practices and technology adoption.
5. Pilot implementation and demonstration of circular value chain practices in selected SSM sites.

Expected measurable outputs include: validated circular processing technologies and methods applicable to SSM, optimized workflows and operating protocols for resource efficiency and waste minimization, demonstrated improvement in recovery rates, profitability, and environmental performance, environmental and social impact assessments with mitigation strategies, business models or frameworks for sustainable small-scale mining operations, technical reports and recommendations for policy, industry, and community adoption and trained SSM operators, technical personnel, and community stakeholders.

Budget and Duration:

The maximum budget allocated for this research priority is Php 20,000,000.00, with a project duration of three (3) years, covering Calendar Years (CY) 2027–2029.

Research Priority: 2. Mine Waste Characterization and Valorization: Assessing Long-Term Feasibility for Carbon Storage, Phytomining in Mined-Out Areas, and Community-Integrated Waste Repurposing

Call Rationale:

Mine wastes and tailings generated from mining operations pose long-term environmental and safety risks if left unmanaged, particularly in abandoned and mined-out areas. However, these

materials also present opportunities for environmental rehabilitation, climate change mitigation, and resource recovery when properly characterized and valorized. Emerging approaches such as carbon storage, phytomining, and nature-based solutions offer promising pathways to transform mine wastes into assets while supporting ecosystem restoration and community development.

Call Objective

The objective of this research priority is to support applied research and technology development on the characterization and valorization of mine wastes to enable their safe, sustainable, and beneficial use for environmental rehabilitation, carbon storage, and community-integrated applications.

Specifically, the call aims to:

1. Generate data and technologies that support long-term and environmentally sound utilization of mine wastes
2. Evaluation of the feasibility of mine wastes for carbon storage and sequestration, including mineral carbonation potential and long-term performance assessment;
3. Advance nature-based and community-centered approaches for the rehabilitation of mined-out areas.

Call Scope

Proposals under this research priority may include, but are not limited to:

1. Assessment of the feasibility and long-term performance of mine wastes for carbon sequestration and storage;
2. Development and evaluation of phytomining and other nature-based solutions for metal recovery and land rehabilitation;
3. Environmental risk assessment, monitoring, and validation of proposed valorization strategies

Budget and Duration:

The maximum budget allocated for this research priority is Php 10,000,000.00, with a project duration of two (2) years, covering Calendar Years (CY) 2027–2028.

Research Priority: 3. Development of technology to treat and utilize tailings for industrial applications

Call Rationale

Large volumes of mine tailings are generated throughout the life of mining operations and are often stored in tailings facilities, posing environmental, safety, and long-term management challenges. At the same time, tailings may contain valuable minerals and materials that can be recovered or converted into inputs for industrial applications. Advancing technologies that enable the treatment and utilization of tailings can significantly reduce environmental risks while improving resource efficiency and supporting industrial development.

This research priority responds to the need for innovative, scalable, and industry-ready technologies that transform mine tailings into value-added products, in line with sustainable mining and circular economy principles.

Call Objective:

The objective of this research priority is to support the development, optimization, and validation of technologies that enable the safe treatment and industrial utilization of mine tailings, thereby reducing waste, minimizing environmental impacts, and creating new economic opportunities.

Specifically, the call aims to:

1. Develop technically viable and environmentally compliant tailings treatment technologies; and
2. Demonstrate the potential of treated tailings for use in industrial and commercial applications.

Call Scope:

Proposals under this research priority may include, but are not limited to:

- Development and optimization of novel physical, chemical, or biological processes to treat, stabilize, or detoxify mine tailings using locally available materials
- Conversion of tailings into industrial raw materials, or other value-added products;

Budget and Duration:

The maximum budget allocated for this research priority is Php 5,000,000.00, with a project duration of two (2) years, covering Calendar Years (CY) 2027–2028.

Specific Features Sought in this Call

1. Proposals must align with the indicated Call Scope and be submitted by qualified and competent researchers from HEIs, RDIs, or other government R&D institutes. Submissions from private entities, consultants, or similar parties will be automatically disapproved.
2. All project staff must have relevant expertise to ensure meaningful technical contributions.
3. If a consultant is involved, a draft Terms of Reference (TOR) must be provided.
4. Proposals should demonstrate clear social and economic benefits. Must address at least one of the seventeen (17) Sustainable Development Goals (SDGs).
5. Proposals must systematically incorporate GAD principles in project design, implementation, and anticipated outcomes. The study should acknowledge that technological development and innovation may have differentiated impacts on women, men, and gender-diverse groups, particularly within the target industry and locality.
6. Proposed research should have a minimum TRL of 3 or 4. Should demonstrate potential for transferability to industry and the local context.
7. All proposals must include at least one Commitment Letter/Letter of Cooperation from: An industry partner engaged in related business, or A concerned agency mandated to adopt/use the research outputs. Failure to submit will result in disapproval or non-consideration.
8. The LIB must include 20% counterpart funding from the implementing agency and private industry partner. Only eligible and allowable costs (e.g., utilities) may be used for counterpart funding or in-kind contribution, as determined by DOST-PCIEERD.
9. For proposals including equipment, provide unit details, specifications (accessories not allowed), and quotations.

10. For any LIB items exceeding Php 100,000.00, provide a detailed cost breakdown.
11. Foreign travel presentation of project outputs in conferences is expected during the last year of the project. For foreign training, proponents are encouraged to tap the PCIEERD RIETOOL Program.
12. Proponents with unliquidated completed projects must secure clearance from the funding agency confirming fulfillment of all obligations.
13. Proponents must have read, understood, and agreed to comply with the Guidelines for the Grants-in-Aid Program of the DOST and its Agencies.

Metals and Engineering Sector

Metals and Engineering (M&E) is one of the priority sectors of the Philippine Council for Industry, Energy, and Emerging Technology Research and Development (PCIEERD) that supports different industries (e.g., manufacturing, agriculture, automotive, aerospace, etc.) through local fabrication of appropriate machineries/equipment and devices, upgrading/strengthening of S&T services through facility establishment, and the development of diverse metalworking technologies through R&D.

The M&E sector was originally composed of four roadmaps, namely: (1) Machining and Fabrication, (2) Metal Casting, (3) Tool and Die, and (4) Surface Engineering. However, despite the priority areas identified through the roadmapping sessions conducted in 2020, few to no proposals were received, particularly under the Tool and Die and Surface Engineering roadmaps. Therefore, the sector decided to develop new and revised roadmaps that will cover most of the technical needs of the industry, subject to validation by stakeholders from the public and private sectors, academe, and industry players through consultations, interviews, Focus Group Discussions (FGDs), and roadmapping sessions.

Since the sector is currently developing its new roadmaps, for this Call, the focus and priority will be on Machining and Fabrication.

In 2024 and 2025, the M&E sector, together with various stakeholders from the local metals industry, conducted Focus Group Discussions (FGDs) and industry immersion activities to start the systematic and validation of the needs, challenges, and priority concerns of the local metals industry across the identified priority areas. The insights that will be generated from these engagements will serve as the basis for understanding existing gaps in capabilities, technologies, and processes, and for formulating practical, industry-responsive solutions to address these gaps and enhance the overall competitiveness of the local metals sector.

Call Objective

The objective of this Call is to enjoin qualified local institutions, engineers, scientists, and individuals to develop and implement practical and innovative solutions that address the challenges and constraints in local product manufacturing, machine fabrication, and production processes, with the aim of improving the competitiveness and productivity of the metals industry.

Call Rationale

Machining and Fabrication

Based on the FGDs conducted, most of the metal manufacturers and fabricators are still dwelling on manual/traditional machine development. In terms of Industrial Revolution level, majority of the metals industry are still within 1.0 to 2.5 and adopting to latest technology trends remains a bottleneck for them due to the following concerns: (1) instead of equipment manufacturing, the industry is still doing single projects fabrication (customized) (2) high importation of equipment resulting for the metals industry to focus on repair and maintenance of imported equipment instead of developing/fabricating new ones, (3) Local die and mold companies have been resorting as traders instead of manufacturers because of lack of market/consistent demand, (4) high cost of labor and operations and (5) lack of S&T facility for testing (e.g., mechanical test, chemical analysis, etc.) for specific area in Visayas and in Mindanao.

Despite the mentioned problems, the metals industry remains steadfast in their craft and still prioritizing the development of equipment for food production/manufacturing (e.g., canneries) and agro-processing equipment.

To continuously support the metals industry, below are the main themes for this Call:

1. Locally Design and Development of innovative, cost-effective, and appropriate Metal Equipment, Machine Parts and Engineered Products for various industries (e.g., food, agro, environment, creative)
2. Establishment/Development of Primary/Secondary Traceability Standards in Support to Metals Industry
3. S&T services for metals industry

The first theme will focus on designing, development, fabrication, automation of machine or development of specialized parts to produce specific designs of equipment/machinery or devices tailored to the demands of specified industry (e.g., food sector, etc). The mechanical processes may include but not limited to fabrication metal cutting, machining, stamping, welding, assembling.

Also, a database of fabricators nationwide should also be established for reference of the local manufacturers/fabricators in terms of raw materials, services offered and possible partnership and collaborations among fabricators to deliver their products.

The second theme will focus on metrology, which supports the entire metals industry through the provision of proper and accurate calibration of tools and measuring instruments used in manufacturing processes. In recent years, the sector has supported metrology-related projects implemented by the Industrial Technology Development Institute (ITDI) of the Department of Science and Technology (DOST), which led to the establishment of the National Metrology Laboratory (NML). The NML is currently pursuing research and development studies aimed at establishing facilities aligned with the International System of Units (SI) to provide local calibration services and achieve self-sufficiency in calibration across various fields (e.g.,mass, temperature, force, and others).

Below are the specific topics sought in this call to address the identified gaps:

Call Scope

1. FASTPhils: Fabricators Assessment and Scoping in the Philippines

2. Establishment/Development of Primary/Secondary Traceability Standards in Support to Metals Industry

3. Innovative local Design and Development of cost-effective, and appropriate Equipment (mechanized/automated), Machine Parts and Engineered Products for the following applications:
   a. Food Industry
      - *Food processing industry (e.g. coconut, coffee, cacao, etc.)*
      - *Mobile food service technologies*
   b. Downstream machinery for Agro-industry products
   c. Creative industry (*e.g. equipment for furniture, weaving, blacksmithing*)
   d. Environment Industry (*e.g. equipment for waste processing/elimination*)
   e. Human Security (*e.g. firearms quality control system equipment, localization of equipment or machines to support the Philippines' Self-Reliant Defense Posture Program (SRDP*)

PCIEERD will fund/endorse maximum of 12 projects not to exceed Php135M covering all projects with a maximum duration of three (3) years for each project.

Specific Features Sought in this Call

The proposal should be well written and must contain the following information in the submitted documents:

1. Technology roadmap (if available).
2. Thorough Review of Literature to clearly present the related research/activities, baseline studies which have been conducted (including patent search, showing no duplication of the proposed technology), as well as the state-of-the-art technology, existing technologies available in the market or current information from which the proposal will take off.
3. Sustainability plan for the proposed equipment/technology to be developed (e.g., maintenance of the developed equipment or technology).
4. Commitment letter/s secured from the identified beneficiary/end-user of the proposed technology.
5. Letter of intent from the identified potential licensee/fabricators/mass producers for proposals that entails fabrication of equipment.
6. For proposals with development of equipment, clearly specify (possibly quantify) these **NSDB-ME** in the proposal: Need, Solution, Differentiation (show this in a matrix), Benefits, Maintenance and repair and service commitment and economic viability.
7. Track record of the proponent related to his/her proposal such as journals published, patents/UMs approved, etc.

8. Include research and development or fabrications laboratory capabilities of the State Universities/Colleges or Higher Education Institutions (HEIs) in terms of facilities and available equipment.
9. List of equipment to be purchased to undertake project activities including its quotations from the supplier.
10. Under equipment development ensure to follow the table below.

Parameter	Existing Equipment/Process/ Technique in the Market	Proposed Fabricated Equipment/ Process/ Technique	Remarks
Process/Techniques			
Material			
Speed/performance			
Capacity			
Dimension/design			
Quality (e.g., produced product/equipment)			
Manpower Needed			
Cost			
Others (Pls specify other parameters applicable/suitable to the propose equipment)			

1. For project leaders with on-going projects, updated reports for their respective projects should be submitted (i.e. technical progress and terminal and audited financial report). For completed projects, clearance from the funding agency from any obligations under the project.

Environment

Theme: Innovative Green Technologies for Sustainable Environment and Circular Economy

Overview

The 2026 Call for Proposals under the Environment Sector focuses on the three sub-sectors, namely: (1) water quality/wastewater treatment and management, (2) air quality, and (3) solid waste management. These topics would like to address pressing national problems by

providing solutions through programs for the prevention and control of water pollution, air pollution and innovative solutions to plastic wastes, respectively.

In addition, the three (3) roadmaps of the Environment sector of PCIEERD namely, S&T Water Environment Roadmap, S&T Clean Air Roadmap and Sustainable S&T Solid Waste Management Roadmap which were developed with collaborative efforts among National Government Agencies (NGAs), academe, non-government organization and other stakeholders, will serve as basis for the development of new programs and projects to be included in the Call. The updated roadmap (2022-2040) sets the direction of each sub-sector which is also aligned with the different national programs such as the DOST's Harmonized National Research and Development Agenda (HNRDA 2017-2022) and the Philippine Development Plan (PDP) to complement the SDG 2030 Agenda and Ambisyon Natin 2040.

Additional Call Document Requirements

- Letter of Commitment from an industry/government partner or end user. Specific involvement must be identified in the letter (e.g. investor in technology development, adopter of the R&D output) as well as their counterpart support in project implementation (e.g. funding, or in-kind donation – equipment, personnel technical support, provisions for service facility)
    - If their counterpart is the use of the facility, estimated amount should be reflected in the LIB and the schedule on the use of the facility is shown in the workplan
    - If their counterpart is the personnel technical support, the number and the estimated salary for their period of participation is shown in the LIB and in the workplan
    - If they plan to adopt the technology, initial plan on the adoption should be reflected in the detailed sustainability plan after project completion
- Detailed Sustainability Plan after the Project Completion
- Technology Roadmap. A clear roadmap of project activities and outputs
- Data on how the project can contribute to the improvement of environmental conditions by including any possible environmental impact from the proposal
- Incorporate the socio-cultural, political, health and economic implications of managing pollution, impact to the industry and its target outcome
- For project leaders with on-going projects, updated reports for their respective projects should be submitted (i.e. technical progress and terminal and audited financial report). For completed projects, clearance from the funding agency from any obligations under the project.
- Research outputs must lead to S&T policy formulations and decision support systems for sustainability

Program 1: National Research and Development Program for the Prevention and Control of Water Pollution

Call Rationale

This sub-program is aligned to the Philippine Clean Water Act of 2004 (Republic Act No. 9275) that aims to protect the country's water bodies from pollution from land-based sources (industries and commercial establishments, agriculture and community/household activities).

It provides a comprehensive and integrated strategy to prevent and minimize pollution through a multi-sectoral and participatory approach involving all the stakeholders. Under *Section 24* of the Philippine Clean Water Act, *Pollution Research and Development Programs,* it states that, the DENR in coordination with the Department of Science and Technology (DOST), other concerned agencies and academic research institutions, shall establish a *"National Research and Development Program for the Prevention and Control of Water Pollution."* As part of the said program, the DOST shall conduct and promote the coordination and acceleration of research, investigation, experiments, training, survey and studies relating to the causes, extent, prevention and control of pollution among concerned government agencies and research institutions.

Over the years, the Department of Science and Technology (DOST) has supported the implementation of this law through the R&D initiatives that have addressed challenges in water pollution such as treatment technologies/techniques for environmental compliance of different types of industries, resource recovery of nutrients, heavy metals, and endocrine disruptors in wastewater and waterbodies.

While previously supported projects contributed to the advancement of knowledge and development of technologies in water/wastewater pollution control, there are remaining gaps in compliance with the national effluent standards as well as detection of emerging pollutants in the wastewater and waterbodies.

In the recent Focus Group Discussion (FGD) conducted with different industry associations and government regulatory agencies, it was found out that due to the updated DENR Administrative Order 2016-08 Water Quality Guidelines and General Effluent Standards, guideline values for nitrates and phosphates are higher which industries find it hard to comply. Thus, new treatment systems/technologies need to be developed to achieve the new DENR standards.

On the other hand, one of the emerging water pollutants that needs immediate intervention is microplastics. In the last five (5) years, several studies has proven that microplastics are already present in waterbodies in the country such as Lake Mainit in Mindanao (Arcadio, 2025), Metro Manila rivers (Tanchuling, 2020), and Laguna de Bay (Arcadio, 2022). Interventions should be implemented to control this emerging pollutant before it can negatively affect the human food chain and overall health of the people.

Furthermore, in the case of the cleaning industry specifically the laundry business, there are an estimated 25,000 – 28,000 laundry shops nationwide including unregistered ones. Small laundry shops cater to the general public with personal clothes, while industrial laundry serves hotels, restaurants/catering businesses, manufacturing and healthcare. Several challenges are needed to be addressed in this specific industry such as limited space and costly wastewater treatment system, high volume discharge of rinse water that affects the microbial community in the sewage treatment system, high water demand that competes with other uses and lesser cleaning efficiency of hard water, and the problems in managing high volume of used sachets of laundry soaps and fabric conditioners. This is another industry that may need R&D intervention for its wastewater management.

Lastly, key water bodies may also necessitate targeted research and development (R&D) interventions. Laguna Lake is the largest lake in the Philippines and 3rd largest lake in Southeast Asia with a surface area of 900 km^2. Its watershed area is approximately 2,920 km^2 with an average volume of 2.9 B m^3 Reference: https://llda.gov.ph. This waterbody has been an important resource by the surrounding localities with a region population of 17, 565, 318 (reference: PSA, 2020) and the country in general. Due to its multiple uses such as fisheries, navigation, temporary storage of floodwater, hydroelectric power generation, source of irrigation, domestic water supply, and recreation. Due to these mentioned uses, there are numerous threats to the lake such as untreated domestic sewage that leads to sediment and nutrient accumulation of the lake causing poor water quality, harmful algal blooms and fish kills. Flooding and saltwater intrusion are also growing concerns in the lake and its vicinity. Several initiatives have been done by the Laguna Lake Development Authority and other partners (https://llda.gov.ph.) However, more interventions are needed to address the constant pressure in the lake and its tributaries. There is a need to provide long-term and sustainable strategies to manage the lake.

Call Objectives

The main objective of this call is to give special emphasis to research and development of improved methods and development of innovative technologies, having industry-wide application for water quality management and pollution control. It is important to note that the program/project should be holistic in approach, closed loop technological interventions that are low-cost/cost effective and innovative, multi-disciplinary or transdisciplinary to foster collaborative learning and inclusive solutions development with all stakeholders.

Call Scope

The R&D initiatives should address/cover the following identified research areas:

1. Cost-effective and portable treatment for nitrate, phosphate, oil and grease and ammonia in accordance with DENR Administrative Order 2016-08 Water Quality Guidelines and General Effluent Standards
3. Development/ Application of scalable treatment and/or removal of heavy metals (HM) and other emerging pollutants in wastewater or waterbodies
4. Development of cost-effective microplastic filtration with treatment technologies for wastewater and sludge from industries and/or communities
5. Development of scalable, low-cost, high-efficiency wastewater treatment solutions for small enterprises /SMEs, including modular STPs for high-density areas and compact systems for condominiums.
6. Innovations in water recycling technologies, such as rinse water recovery systems and hybrid rainwater-recycling models
7. Development of cost-effective water softening technology
8. Development of cost-effective technologies for rehabilitation and conservation of Laguna Lake

PCIEERD will fund/endorse maximum of 8 projects not to exceed Php100M budget covering all projects. The maximum duration for each project is 3 years.

Program 2: National Research and Development Program for the Prevention and Control of Air Pollution

Call Rationale

Another national law that DOST supports is the Philippine Clean Air Act of 1999 (Republic Act No. 8749) that outlines the government's measures to reduce air pollution and incorporate environmental protection into its development plans. Under the 'Implementing Rules and Regulations for Philippine Clean Air Act, the Air Pollution Research and Development Program, Section 1 states that a "*National Research and Development Program for the Prevention and Control of Air Pollution*, the DENR through its bureau, in coordination with the Department of Science and Technology (DOST), other agencies, the private sector, the academe, NGOs and POs shall, establish a National Research and Development Program for the Prevention and Control of Air Pollution."

The Sustainable S&T Clean Air Roadmap (2022-2028) of DOST-PCIEERD aligns its goal to improve and maintain good air quality across the Philippines. The law establishes the National Air Quality Guideline Values for key pollutants, which serve as targets for cities and municipalities. Due to the high cost of internationally accepted monitoring equipment, locally manufactured sensors were developed in order to complement the limited air quality monitoring stations used by DENR. The next step is to develop technologies for the control and abatement of air pollutants.

On the other hand, climate change and global warming are also a global environmental issue that needs urgent attention. As an archipelagic country, the Philippines is one of the countries at greatest risk to climate-related hazards such as increased frequency and severity of storm surge, floods, landslides, and droughts, among others. These exacerbate risks to agriculture, energy, water, infrastructure, human health, and coastal ecosystems. As a signatory to the Paris agreement, there is a need to develop technologies to assess and mitigate greenhouse gas (GHG) emissions to avoid and mitigate the perceived threats to the country.

With these concerns on air pollution control and abatement as well as climate change mitigation solutions, the focus areas that need to be addressed are GHG capture & mitigation technologies, containment technologies to prevent diffusion of pollutants/ industrial gas leaks and cost-effective technologies for air pollution abatement and control.

One of the emerging threats in the environment and human health is microplastics and nanoplastics. Several interventions have been implemented for microplastics in water. However, very few are being developed for monitoring, control, and abatement for microplastics in ambient air. Studies in this area should be implemented in the country to have localized findings and interventions.

Call Objectives

The proposals to be submitted should be able to develop technologies that will support new interdisciplinary research and innovation that will tackle Sec. 15. Air Pollution Research and Development Program i.e., establish a National Research and Development Program for the prevention and control of air pollution. Proposals should give special emphasis to research

and development of improved methods and development of innovative technologies having industry-wide application for the prevention and control of air pollution.

Call Scope

The R&D initiatives should address/cover the following identified research areas:

1. Development of GHG emission monitoring & assessment tools and protocols
2. Development of GHG capture & mitigation technologies
3. Establishment of locally developed emission factors and standards
5. Development of real-time spatio-temporal emission inventory, monitoring and ambient air quality forecasting
6. Development of monitoring and analysis tool for presence of air pollutants, microplastics and other gas leaks in ambient air with innovative containment technologies

Note: PCIEERD will fund/endorse maximum of 6 projects not to exceed Php100M budget covering all projects. The maximum duration for each project is 3 years.

Program 3: Innovative Solutions to Solid Waste Management

Call Rationale

From the 2023 Performance Audit report of the Commission of Audit (COA), solid waste generation in the Philippines is steadily increasing from 2017 to 2021 despite government programs to improve solid waste management. Several factors contribute to this scenario: inconsistent implementation of waste segregation and waste diversion, wherein the significant presence of mixed wastes was found in landfills and no sufficient waste facilities and landfills to service the LGUs and barangays nationwide., among others.

In the current DENR Solid Waste Management Division website, *the Philippines' estimated waste generation from 2015-2024 increased from 51,424 metric tons/day in 2015 to 61,700 metric tons/day in 2024 having NCR and Region4A both with the highest generation of more than 9,000 metric tons/day.* Facilities for waste infrastructure should be systematized and institutionalized to strengthen the waste management flow and improve the solid waste management of the LGUs.

A sustainable solution that can be explored by the country is an integrated solutions following Bio-Circular-Green Economy (BCG) model for solid waste reduction, prevention & control is another pathway that the country can explore to support a sustainable and circular economy.

In the publication by Jambeck et al, 2015 (reference: https://www.futureocean.org/ozeanwissen/topics/plastic_en.php) the Philippines together with China and Indonesia was tagged as the top three plastic polluters in the world. From a more recent study by Meijer et al 2021 (reference: https://www.science.org) it is estimated that 1 million MT of plastic waste enters the ocean every year and the Philippines was tagged as the leading contributor with an estimated 356,371 MT/year. The study's waste emission estimates were based on the relatively small land surface compared to the length of the coastline and

high precipitation rates of the country. Local studies of our country on the actual status and dynamics of plastic wastes that reach the waterbodies (e.g. rivers and seas) should be conducted to validate these results, update the status of plastic waste generation nationwide and come up with a sustainable plan on plastic management.

Aside from policies to be strengthened, technologies to prevent and mitigate marine litter are necessary to combat plastic pollution. Thus, the need for R&D on innovative strategies and technologies for marine litter mitigation and management (e.g. AI/GIS for predictive analytics & real-time simulations, etc.). Further, other strategies that can address solid waste management issues with the integration of Circular Economy pathways are integrated solutions following BCG model, technologies for solid waste (non- metal wastes) prevention and control for ship recycling, and scalable technologies for solid waste recycling/reuse (i.e. single use plastics).

As a result of the consultation with the laundry industry, one of the growing concern is the high volume of accumulated plastic wastes from sachets, carboys and other wastes with laminates. Thus, a technology to address these types of plastic wastes with circular solutions should be developed to avoid or at least delay ending up in the landfills. Another growing industry is the shipping industry for both people and cargo. However, waste management is also a long time issue that affects both land and water due to improper waste management on board. In this case, there is a need to improve the waste management systems through smart tools or technologies for merchant vessels.

It is also worth noting to develop or improve decentralized waste processing technologies for rural and urban barangays or households. This is the smallest unit of the community where solid wastes accumulate, and proper solid waste management should start.

Call Objective

The objective of this call is to support inter-disciplinary research to understand the risks that solid waste pollution poses and provide technological interventions. Therefore, this call requires the proposals to address the key gaps and to incorporate the socio-cultural, political, health and economic implications of managing pollution while providing scientific data that will support and lead to formulations of policies.

Call Scope

The R&D initiatives may include the following potential study areas:

1. R&D on innovative strategies and technologies for marine litter mitigation and management (e.g. AI/GIS for predictive analytics & real-time simulations, etc.)
2. Integrated solutions following Bio-Circular-Green Economy (BCG) model for solid waste reduction, prevention & control
3. Development of Clean Technologies for solid waste prevention & control and materials recovery and utilization (non-metal) from ship recycling
4. Development of cost-effective technologies for managing and recycling sachets and carboys and other plastic waste (i.e. laminates) under circular economy model

5. Development of improved waste management systems and technologies for merchant vessels
6. Development of decentralized waste processing technologies for rural and urban barangays

PCIEERD will fund/endorse maximum of 8 projects not to exceed Php100M budget covering all projects. The maximum duration for each project is 3 years.

Creative Industry Sector

For 2026, the PCIEERD Creative Industry Sector shall accept proposals under the following priority programs:

1. Footwear Program
2. Furniture Applications Program

Call Rationale

In the 2025 Global Innovation Index (GII), the Philippines ranked 50th out of 139 countries, entering the top 50 and emerging as a consistent innovation performer in Southeast Asia, East Asia, and Oceania. The country ranks 16th in creative goods exports, 1st in high-tech exports, 4th in high-tech imports, and 20th in ICT services exports, reflecting a trade-driven economy integrated into global markets and focused on applied innovation (https://www.wipo.int/web-publications/global-innovation-index-2025/en/gii-2025-results.html).

The creative industry is a rapidly growing sector globally, contributing significantly to economic growth, cultural enrichment, and sustainable development. In the Philippines, this sector reflects the country's rich cultural heritage and abundant creative talents. According to the Philippine Statistics Authority, the creative economy grew by 8.7% in 2024, representing 7.3% of GDP and employing over 7.5 million workers (PSA, 2025).

Within the creative economy, Symbols, Images, and Related Activities accounted for the largest share at 33%, followed by Advertising, R&D, and other Artistic Services (21.4%) and Digital Interactive Goods and Services (20.6%), highlighting the economic significance of heritage, design, visual communication, and innovation-driven sectors (https://psa.gov.ph/system/files/technical-notes/ons-cleared_3-Technical-Notes-Creative-Mar22_ONS-signed-1.pdf).

These activities cover the manufacturing, rental, and trade of products in textiles, garments, footwear, furniture, jewelry, fashion accessories, and toys. The Philippines is therefore well-positioned to strengthen innovation and competitiveness in subsectors such as footwear and furniture through targeted research and development. Advancing R&D in these areas will not only support market diversification and value addition.

Through this call, DOST-PCIEERD seeks to align its programs with the objectives of the Philippine Creative Industries Development Act (RA 11904), ensuring that research and innovation actively address sectoral challenges while generating tangible socio-economic benefits. This initiative represents a forward-looking strategy to reinforce the Philippines as a leading creative hub in Asia by 2030.

Call Objective

The Call aims to provide support to qualified S&T research proposals of programs and projects with innovation and R&D solutions to identified priority areas of the creative industries particularly on footwear and furniture. Specifically,

1. To increase research and innovation that are relevant to future innovation waves in the creative industries sector.
2. To spur collaboration across innovation stakeholders in the Creative Industries and encourage long-term R&D partnerships between academe, research and development agencies, creative enterprises, and other stakeholders.
3. To encourage development of homegrown technology and technological capabilities that are relevant to the sector.

***Specific Features Sought* for all Creative Sector Programs:**

1. The implementing agency and proponent should have a track record and established expertise on the proposed project.
2. For project leaders with ongoing projects, updated reports for their respective projects should be submitted (i.e. technical progress and terminal and audited financial report). For completed projects, clearance from the funding agency from any obligations under the project.
3. The proposal must include the following details:
    a. Detailed Review of Literature by including previous works and/or relevant studies where the proposal will take off, showing no duplication in proposal concept with local research conducted
    b. Information on potential socio-economic impact and marketability demonstrating the importance of the proposed technology to support a strong value proposition:
        - Impact Statement
        - Projected employment generation after the completion of the project. Identify the specific jobs to be involved in and estimate the number of personnel needed
        - Estimated increase in income/productivity
        - Current demand and potential market expansion
    c. Advantages of the proposed intervention and its target cost over the existing/commercially available/similar interventions
    d. Potential impacts to the identified industry partner or partner institution
    e. Data on how the project can contribute to the improvement of environmental conditions by including any possible environmental impact from the proposal and waste management plan
    f. It has potential for commercialization. Commitment letter/s from identified cooperating/industry partner/s to support the marketability of the proposed product to demonstrate interest are required. Specific involvement must be identified in the letter (e.g. investor in technology development, adopter of the R&D output) as well as their counterpart support in project implementation (e.g. funding, or in-kind donation – equipment, personnel technical support, provisions for service facility)

g. Adequate counterpart funding from the implementing and partner agencies
h. Risk Management Plan
i. Technology Roadmap.

4. Technology Readiness Level between 2-6. It should encompass Technology Formulation, Validation of Technology, Small-Scale Prototype, and Large-Scale Prototype (if applicable).
5. Clear plans for utilization of project results:
    a. Strategies for wider adoption by indicating how the project results can be scaled up to be widely used or available
    b. Details on how the target beneficiaries will participate or benefit from the project
    c. Plans for promotion and transfer of technology to end-users
6. Sustainability plan including established mechanisms in terms of institutional, financial, and human resources capability after project completion.

3.6.1 Footwear Program

Call Rationale

The Philippine footwear market reached USD 3.5 billion in 2024 and is projected to grow to USD 6.49 billion by 2033 (CAGR 6.7% from 2025–2033). Growth is driven by rising incomes, urbanization, e-commerce, fashion awareness, demand for sustainable products, and an expanding middle class, highlighting the sector's strong potential for innovation and R&D (https://www.imarcgroup.com/philippines-footwear-market).

Focus Group Discussion (FGD) results indicate persistent challenges that have constrained the subsector's growth, including:

a. Outdated or worn-out equipment for traditional shoe-making processes
b. Limited number of skilled artisans (sapateros)
c. Restricted marketing opportunities for local products
d. High volume of imported low-cost footwear
e. Limited availability of raw materials locally
f. Lack of advanced footwear design tools and technologies
g. Diminishing institutions offering training, education, and R&D in footwear production and design

In 2025, this subsector supported two completed projects on insoles and sustainable footwear materials, alongside one ongoing project and one new project set to commence this year. These initiatives focus on developing technologies for footwear comfort, components, and the integration of natural fibers, incorporating Filipino fit and sizing, as well as design-oriented R&D. Efforts also continue to advance sustainable textile technologies for footwear applications, reinforcing innovation, functionality, and environmental responsibility.

Despite the market potential and ongoing R&D efforts, no proposals were submitted under this subsector in the last call for proposals. This call aims to encourage and support the submission of innovative projects that address persistent industry challenges, promote sustainable and locally adapted technologies, and strengthen the competitiveness of the Philippine footwear industry in both domestic and international markets.

Call Scope

To address these gaps, the Council will provide fund support for the following research areas:

A. Material Innovation for Footwear Applications: R&D on Sustainable Local Materials for Footwear, including for uppers and banhay (platforms of slippers and wedge shoes).

B. Footwear Design and Technologies

- R&D on Specialized Footwear, including Smart Footwear Design for Enhanced Functionality and Performance
- R&D on Design for Footwear, including Optimization Advanced Simulation Software for Footwear Design and Manufacturing

Target Program/Projects: 2
Total Budget: 30M

3.6.2 Furniture Applications Program

Call Rationale

The Philippine furniture market is valued at approximately USD 844 million in 2025, with projections to reach USD 1.7 billion by 2033, reflecting steady expansion of both domestic and export demand (https://www.sunstar.com.ph/amp/story). Growth is driven by increasing urbanization, rising disposable incomes, and heightened consumer interest in home improvement and interior design. Demand has shifted toward modern, eco-friendly, and sustainable furniture, highlighting evolving lifestyle preferences and the Philippines' potential as a supplier of high-quality, design-driven furniture in both local and international markets (https://www.globenewswire.com/news-release/2024/10/31/2972654/28124/en/Philippines-Wooden-Furniture-Export-Industry-Report-2024-2033-Focus-on-Japan-United-States-Singapore-Canada-Netherlands-and-South-Korea.html).

FGD results highlighted several persistent challenges in the subsector, including:

a. Inconsistent quality of raw materials, particularly natural fibers and wood sourced from provincial areas.
b. Limited access to modern pre-treatment and pre-processing equipment in source regions.
c. Minimal R&D engagement, as most research institutions and universities focus primarily on design rather than process or material development.
d. Difficulties among some industry players in transitioning from conventional methods to modern design and manufacturing tools.

These constraints underscore the need for targeted research and development programs to enhance material quality, process innovation, and design capabilities, supporting the sector's competitiveness and global export potential.

Call Scope

The program covers project proposals incorporating innovative solutions and research in material innovation and design tools in the following areas/priorities:

A. Materials Development & Innovation

a. Development and standardization of novel natural and synthetic materials for furniture, including:
    i. Outdoor: bamboo (kawayang tinik), plastic rattan, and other innovative sources
    ii. Indoor: abaca fiber and other novel materials
b. Bio-based adhesives, finishes, and resins with low formaldehyde and VOC for plywood and other engineered wood products
c. Valorization of waste materials for paddings and panels (e.g., wood shavings, agricultural residues)
d. Sustainable and biodegradable furniture packaging and filler materials

B. Furniture Design and Application
    a. AI-based solutions - Furniture Design tools

Target Program/Projects: 3
Total Budget: 70 M

IV. Science Communication Sector

Science Communication for Innovation Program

Call Overview

The DOST - Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD) is offering support for Science Communication proposals for 2027 funding. The call is open to all science communicators, researchers, DOST information officers, and other key players of the said discipline. It is anticipated that the R&D funding will lead to an inclusive, integrated, and innovative approach of science communication in the country.

Call Rationale

Science Communication (Scicom) is a growing area of practice and research (Burns, 2003) that plays a vital role in today's development challenges. The Philippines, although having a rich documented history of science and its development (e.g. Anderson, 2007 Velasco & Baens-Arcega, 1984), still needs to delve into the "identity" or "face" of Scicom in the country.

The weak state of science culture in the Philippines is brought by several factors one of which is the Filipino attitude towards science and the traits distinct to it, or the whole science culture. This scenario is experienced in a typical Filipino home as well as in schools. (Licuanan 1998, Nebres & Intal, 2007)

It is in this light that constant efforts should be made to foster science culture in a variety of ways. First is to improve science communication throughout the nation while educating influential figures in academia, the media, and the scientific community. Secondly, is to make the most of the museum's potential as a resource for nontraditional education.

Efforts in promoting and communicating science are continually initiated by DOST in collaboration with other significant key players in the scientific and non-scientific community. Recently, DOST's Science Communication Agenda was put into place along with the presentation of DOST's Harmonized Science Communication Framework that was projectized thru UPLB-College of Development Communication (CDC). Meanwhile, the Science Communication Roadmap is being updated along with other undertakings in the said field.

From 2023 to 2025, Stakeholders' Consultations were conducted by the PCIEERD Information Group to update the existing Science Communication Roadmap, which focused on the role of scientific communication in the nation, the value of science centers as a vehicle for communicating and disseminating information in science, and the emphasis on research extensions on accelerated communication to DOST R&D projects.

These consultations identified gaps in areas such as basic research, evaluation metrics, and Scicom technologies. Thus, it is vital to maintain endeavors towards an integrated, inclusive, and innovative strategy on science communication in the country through R&D support.

The following are the specific objectives of the call:

1. To provide R&D support for research on science communication
2. To provide R&D support for the establishment and/or development of science communication infrastructure, science centers, and technologies.

A. **Science Communication for Innovation Program Research Extension to Accelerate Communication (REACH) Program**

To extend assistance to researchers and innovators who have completed the council's R&D training and aim to diversify the study's integration to create science and technology-based solutions. The program will focus on showcasing the research output through information and dissemination initiatives that cater to a specific audience of their information and dissemination activities.

1. Development of Information & dissemination activities

Call Objective

- Proposed projects that are aimed to develop any of the following:
    a. Capacity building among targeted beneficiaries (seminars, conferences, town hall meetings)
    b. Promotional and public engagement efforts like press conferences, media engagements, media buying, exhibitions

Call Scope and Budget

PCIEERD will fund research on the development of information and dissemination activities with a maximum budget of Two (2) Million Pesos per year per project. The proposed project should run for a period of one to two (1-2) years only.

2. **Production of IEC materials**

Call Objective

- Proposed projects that are aimed to develop materials to include traditional and non-traditional methods such as learning management systems, knowledge management systems, websites and social media accounts, video production, physical kiosks and among others in selected locations

Call Scope and Budget

PCIEERD will fund research on the development of information and dissemination materials with a maximum budget of Three (3) Million Pesos per year per project. The proposed project should run for one to two (1-2) years only.

QUALIFICATION REQUIREMENTS

- Completed R&D and Non-R&D Projects supported by DOST-PCIEERD that aim to conduct activities for knowledge sharing and information dissemination. (Supported with terminal reports)
- The initiative's project leader can continue to serve as the project leader with assistance from a co-project leader who is a science communication expert and who will serve as the focal person for information sharing and promotions. (Supported with CV and track record)
- With measurable projected outcomes that can benefit its intended audience with a minimum of one year-period or a maximum two-year period project implementation
- With sustainable plans to guarantee that the project will continue its effort to disseminate information even after the project completion.
- Letter of commitment from beneficiary agency, partners, cooperating organizations/stakeholders.

REACH Program	**Budget Allocation**	**Duration**
Call Themes		
Development of Information & Dissemination activities	Php 2,000,000.00	1-2 Year/s
Production of IEC materials	Php 3,000,000.00	2-3 Years

Application Requirements

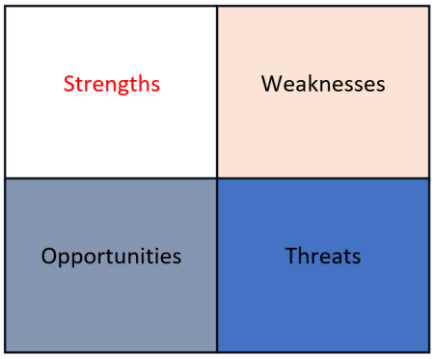
1. Letter of Intent and Commitment *
2. Endorsement letter from the Head of Agency or Institution
3. Application Form
4. Curriculum Vitae (Project Team- including the science Communication consultant/ experts in the project)
5. Communication Plan (See Annex A for template)
6. Final Terminal Report of the DOST/ DOST PCIEERD Project (DOST Form 15)

(Guidelines in Writing a Communication Plan)

Introduction: The introduction should have the following key points:

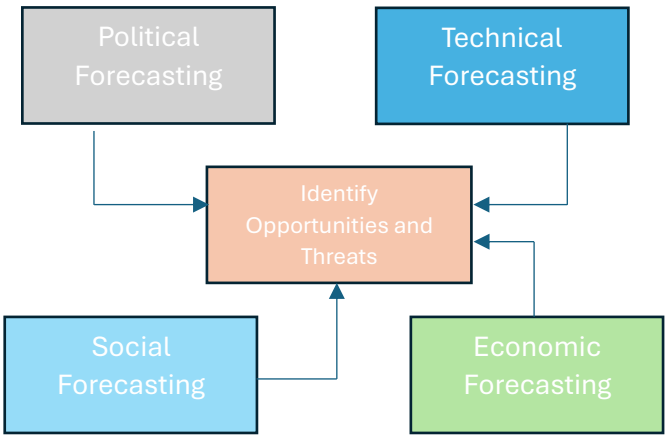
- Discuss the project and what it is all about. The project can use three methods or frameworks, like the SWOT **(Strengths, Weaknesses, Opportunities, Threats)** analysis framework or the **PEST (Political, Environmental, Social and Technological) Evaluation or the (Political, Economic, Sociological, Technological, Legal and Environmental)** analysis framework, to create the narrative for the introduction.
    a. Situation analysis is a helpful instrument for evaluating the general performance and capabilities of an organization. The project can investigate both the internal and external settings when conducting a situation analysis. The SWOT analysis may be the ideal tool in this regard.

- **SWOT (Strengths, Weaknesses, Opportunities, Threats) Analysis:** A SWOT analysis lets you look at the organization's strengths and weaknesses, as well as its possibilities and risks in the external environment. This framework is also a great way to explain why the study is essential and what it seeks to achieve. SWOT helps in **identifying the key communication goals and objectives and developing strategies for achieving them**.



- **PEST (Political, Environmental, Social and Technological) Evaluation**

  When using a PEST method, you can look at the political, environmental, social, and technological aspects that affect your organization's external environment and can have a big impact on how your business operates. PEST is best used for SciComm projects that also deals with marketing and advertising operations and concepts.



- A PESTLE analysis studies the key external factors (political, economic, sociological, technological, legal, and environmental) that influence an organization. It can be used in a range of different scenarios. PESTLE is best used in the context of science communication and in the introduction to a communication plan to analyze, detect, and understand broad, long-term trends. If the project being proposed deals with brand positioning, growth targets, risks, and productivity in a specific science communication gap/threat, this framework can be used in the narrative of a strong introduction.

The introduction should also answer the following questions:

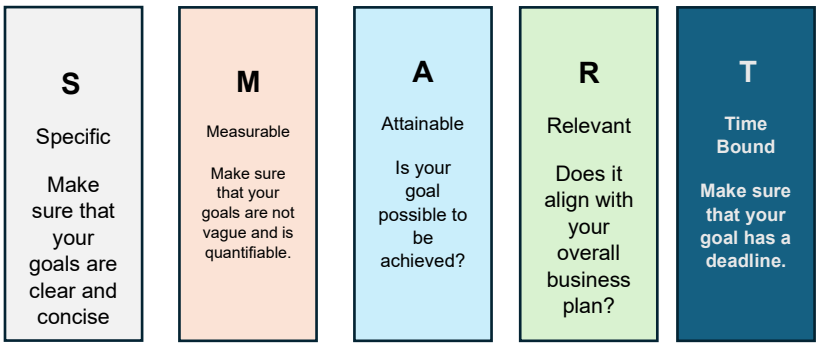
1. Why is a communication plan necessary, and what is the purpose of the project?
2. The project should include a brief approach and premise on the planned goals and objectives of the project, as well as how they would want to be implemented in this area.
3. When submitting a grant proposal for the REACH Program, it is necessary to include a brief overview of the former DOST / DOST PCIEERD study. It should provide an update on the project's status, explain why this plan is necessary, and explain how it will change the project or proposal considering the communication direction.

I. Objectives:

Identify and define objectives and goals. Once you know where you stand, you can find your direction. The next step is to define your goals. Think of the outcomes and results you want to achieve from your communication plan. These will become your goal(s) as you develop your communication plan.

Make sure that the goals you select are SMART:

SMART GOALS



(Example):

The DOST-PCIEERD's 13th anniversary celebration aims to promote its world class innovations for the Filipino People.

Particularly, this aims to:

- *Acknowledge DOST stakeholders through award recognition on the following:*
  - ***Kabalikat Awards:** A recognition for Startup, Academic, Government, and Private*

- ***WHW Awards**: A recognition for women entrepreneurs under the Women-Helping-Women: Innovating Social Enterprises Program*
- ***Excellence in Project Implementation and Completion (EPIC) Awards:** A recognition for the project leaders who excel in their project implementation.*

- *Introduce new and budding research and researchers on industry, energy, and emerging technologies.*
- *Foster strong and continued collaborations with different sectors*
- *Increase social media presence by reaching at least 100 additional PCIEERD followers within the promotion phase of the 13th anniversary.*

II. ***Key Messages:** The key messages are the main points you want your audience to hear, understand, and remember. They are succinct summaries of your work that emphasize your methodology, contributions to stakeholders, and unique selling features.*

III. Target Audience, Media Channels, and Strategy

Prior to selecting the media channels and strategy, the target audience needs to be identified. Before creating media channels and methods, the proponents ought to take psychographics and demographics into account, as the target audience in this matrix ought to be readily apparent. The study and categorization of individuals based on their attitudes, goals, and other psychological parameters is known as psychographics, and it is particularly used in market research. The study of a population according to its age, race, and sex is known as demographics.

When developing your media channel strategy, consider the most efficient channels that come to mind when organizing the distribution of information about media channels and approaches. When you communicate with various audience segments, be careful to choose the right channel.

The proponent can use the following matrix: (Example):

Key Message	*Target Audience*	*Strategies*	*Channels*	*Expected Outputs*	*Date of Implementation*	*Weighted Mean*
Food Innovation Center is the lead provider of food technologies in the region	*Small and midsize enterprises (SMEs) owners, ages 45-55*	*Press conference about the importance of the project*	*Face to face press conference*	*20 media outlets present during the press conference from the local and national media (traditional and new media)*	*2nd quarter of the project* *End of May*	*20%*
		Social Media Posting	*Facebook, Instagram,* *Websites*	*20 collateral to each media platform, in the first 2 weeks of implementation*		

(Sample Communication Plan)

I. Introduction:

This communication plan captures the entire scope of communication strategies for the 13th PCIEERD Anniversary with the theme **"Philippine Innovation Expo: Celebrating Excellence through Innovative Collaboration,"** organized by the Department of Science and Technology—Philippine Council for Industry, Energy, and Emerging Technology Research and Development (DOST-PCIEERD). Different tactics will be implemented, including promotions and invitations through traditional and new media, including but not limited to the production and publication of news articles, the production of promotional materials, and coordination with various local and international partners in academia, industry, and the media.

II. Objectives:

The DOST-PCIEERD's 13th anniversary celebration aims to promote

- Acknowledge DOST stakeholders through award recognition on the following:
  - **Kabalikat Awards:** A recognition for Startup, Academic, Government, and Private
  - **WHW Awards**: A recognition for women entrepreneurs under the Women-Helping-Women: Innovating Social Enterprises Program
  - **Excellence in Project Implementation and Completion (EPIC) Awards:** A recognition for the project leaders who excel in their project implementation.
- Introduce new and budding research and researchers on industry, energy, and emerging technologies.
- Foster strong and continued collaborations with different sectors
- Increase social media presence by reaching at least 100 additional PCIEERD followers within the promotion phase of the 13th anniversary.

III. Key Messages

- DOST-PCIEERD is the Nexus of Innovation through excellence and collaboration**.**
- DOST-PCIEERD is your partner in innovation in industry, energy, and emerging technologies.
- DOST-PCIEERD welcomes public and private partnership.
- DOST-PCIEERD pushes the boundaries of innovation, exhibits cutting-edge robotics demonstrations through the Megaworld Corporation.
- DOST-PCIEERD recognizes the contributions of its collaborators.

Target Audience, Strategies and Media Channels

Key Message	Target Audience	Strategies	Media Channels	Date of Implementation	Weighted Mean (%)
DOST-PCIEERD is the Nexus of Innovation through excellence and collaboration	Businessmen Industry Players Start Ups NGAs	Traditional and Digital Media interviews Holding conducting Events Press conference	Three Media Interviews WITH GMA 7, The Philippine Star and Rappler	January-February 2024	20%

	Innovators Researchers	Robotics Exhibit with Megaworld Social Media Campaigns Email Blast On-ground activation			

IV. Impact Assessment

DRIVING INNOVATION THROUGH EVIDENCE: IMPACT ASSESSMENT OF DOST PROJECTS

Call Rationale

This call for proposals emphasizes the importance of both ex-ante and ex-post analyses in the evaluation of projects.

Ex-ante analysis serves as a predictive tool, offering a forecast of potential outcomes that aids in designing interventions likely to achieve their intended goals while mitigating possible risks. By projecting the likely impacts and benefits before project implementation, this analysis allows for necessary adjustments and improvements, ultimately enhancing the effectiveness of the interventions.

Conversely, ex-post analysis provides a retrospective assessment of actual outcomes and impacts following project completion. This evaluation is essential for measuring the success of the intervention, understanding its long-term effects, and extracting valuable lessons learned. It enables an evaluation of whether the project met its objectives and offers insights that can inform future initiatives.

Through systematic evaluation, the Department of Science and Technology (DOST) can ensure that its investments are impactful and aligned with its strategic goals. This process not only optimizes resource allocation and informs future decision-making but also demonstrates value to stakeholders. By reinforcing its commitment to scientific advancement and socio-economic development, DOST reaffirms its role as a catalyst for progress and innovation in the Philippines

Objective

This call aims to evaluate and quantify the social, economic, and environmental impacts of completed and proposed projects funded and monitored by DOST and PCIEERD. These assessments will be conducted through comprehensive ex-ante and ex-post analyses.

Call Scope

Proposals should assess the impacts of the following research and development projects:

1. For Ex-Posts Analysis:

- Energy Projects
- Bamboo related projects

2. For Ex-Ante:
   - Industrial Biotech Products

If interested, documents related to the R&D projects for assessment may be requested from the Policy Unit of the Policy Coordination and Monitoring Division (PCMD) of DOST-PCIEERD. Access to these documents will be granted upon the execution of a Non-Disclosure Agreement (NDA).

Specific Features Sought in this Call:
The proposed projects should demonstrate the following characteristics and should be well-written in documents:

Ex-Post	Ex-Ante
• Describe the processes and dynamics involved in the conceptualization, formulation, and implementation of various DOST and/or PCIEERD-funded programs/projects; • Validate the R&D programs/projects' theory of change and impact pathways; • Determine the actual direct and indirect outcomes and impacts associated with the programs/projects; • Estimate the economic returns from the programs/projects; • Identify the best practices and lessons learned during and after the implementation of the programs/projects; • Formulate policy recommendations for the improvement and sustainability of the programs/projects.	• Describe the processes and dynamics involved in the conceptualization, formulation, and implementation of various DOST and/or PCIEERD-funded programs/projects; • Develop the programs/projects' theory of change and potential adoption/impact pathways; • Estimate the potential outcomes and impacts associated with the programs/projects; • Formulate policy recommendations for the improvement and sustainability of the programs/projects.

PCIEERD will fund/endorse two (2) Ex-post projects and one (1) Ex-Ante project not to exceed PhP 15M budget covering all projects. The maximum duration for each project is 1.5 years for PCIEERD-GIA and 2 years for DOST-GIA respectively. The breakdown is as follows:

	Themes	Budget (in PhP)	Fund Source
	Ex Post		
1	Impact Assessment of DOST/PCIEERD Energy Projects	5M	PCIEERD-GIA
2	Impact Assessment of DOST/PCIEERD Bamboo Projects	5M	DOST-GIA
	Ex Ante		
3	Industrial Biotech Products	5M	PCIEERD-GIA

V. Science for Change Program (S4CP)

The Science for Change Program (S4CP): Accelerated R&D Program for Capacity Building of Research and Development Institutions and Industrial Competitiveness was created to accelerate science, technology and innovation (STI) in the country in order to keep up with the developments wherein technology and innovation are game changers. Through the Science for Change Program (S4CP), the DOST can significantly accelerate STI in the country and create a massive increase in investment on S&T Human Resource Development and R&D.

The S4CP has four component programs, namely: (1) Niche Centers in the Regions for R&D (NICER) Program, (2) R&D Leadership (RDLead) Program, (3) Collaborative R&D to Leverage PH Economy (CRADLE) and (4) Business Innovation through S&T (BIST) for Industry Program.

1. Niche Centers in the Regions for R&D (NICER)

NICER is a component program of the Science for Change (S4C) Program. It is being implemented to capacitate Higher Education Institutions (HEIs) in the regions to make significant improvements in regional research by integrating developmental needs with existing R&D research capabilities and resources.

The DOST will provide institutional grants for Higher Education Institutions (HEIs) to establish a NICER that will help improve their S&T infrastructure and provide for quality research that will catalyze and promote regional development. Previously funded NICER projects which are ready for Phase 2 are also encouraged to submit proposals.

The DOST is now ready to accept R&D proposals for 2027 funding from HEIs and their partner RDIs, NGAs, and NGO/POs for the NICER Program. The R&D proposals to be submitted should provide a solution to the identified needs of the region and meet the general criteria of the program.

Who may apply?

1. All Higher Education Institutions (HEIs) with proven competence and track record in R&D as well as impact on the local industry may apply.
2. All existing NICERs that have completed their program implementation may submit new R&D proposals under their respective niche program.
3. Ongoing NICERs with at least one (1) year of implementation and high accomplishment rates may also submit proposals for additional R&D components.
4. Any HEIs, RDIs, NGAs, or NGOs/POs who will collaborate with existing NICERs.

2. Research and Development to Leverage Philippine Economy (CRADLE)

CRADLE encourages synergistic relationships among the academe, research and development institutions, and the industry through collaborative Research and Development (R&D) projects. Under the CRADLE Program, a local industry partner determines a problem/need which requires an R&D solution, the partner higher education institution (HEI) or Research & Development Institution (ROI) undertakes the R&D to solve

the problem/need, and DOST provides funding support to the project of up to PHP 5 million for a period of 1 - 3 years.

The DOST is now ready to accept R&D proposals for 2027 funding from HEIs/RDIs together with their partner company for the CRADLE Program. The R&D proposals to be submitted should provide a solution to the identified needs of the industry and meet the general criteria of the program.

Who may apply?

Any duly recognized HEI or RDI with a proven track record in R&D in partnership with at least one Filipino--owned company which has been registered and operating for at least 3 years.

To be an eligible industry partner, the company must:
1. Be Filipino-owned (at least 60% ownership)
2. Be operating in the Philippines for at least 3 years and be able to provide proof of active compliance with statutory regulations
3. Provide at least 20% of the project cost as counterpart funding (in cash, in kind, or person -hours)
4. Commit to adopt the output of the research through signing a technology adoption certificate. Plans for the use of the proposed technology and the mode of technology transfer after the project must be included and clearly discussed in the business plan.
5. Show how the research output will be adopted

All proposals must be in line with the priority R&D areas and industries identified by the DOST.

Intellectual Property Concerns

The HEI/RDI and its partner company are encouraged to start discussions and agree on the IP rights/ ownership as early as the Proposal Writing stage. A Collaborative Research Agreement (CRA) including details on the IP rights and the method of technology transfer must be executed by the HEI/RDI and the partner company to formalize the agreement.

3. I-CRADLE Program

The DOST aims to expand the benefits of university-industry collaboration through the Industry- level CRADLE Program (I-CRADLE). In the I-CRADLE Program, industry-wide problems or needs shall be identified and solved through R&D with the goal of increasing the competitiveness of Philippine industries.

Under the I-CRADLE Program, industry-wide needs and problems will be determined through appropriate methods, which may include but are not limited to consultations, surveys, and focused group discussions, with companies belonging to the same industry. The HEIs and/or RDIs which are experts in the identified field shall undertake the research and development. Funding shall be provided by the DOST, complemented by counterpart funding from the collaborating parties from the industry sector and the HEI and/or RDIs.

Together, the academe as the producer of knowledge and human resource, and the industry as the entity that translates technologies to real-world applications, shall generate new opportunities for Filipinos in the form of new industries, enterprises, jobs, and solutions to pressing community and national problems. The collaboration shall ensure the timeliness and relevance of R&D endeavors, with reference to practical and pressing national needs.

Who may apply?

Any duly recognized HEI/RDI with a proven track record in R&D in partnership with a Partner Industry Association or Group defined as any of the following:

1. Industry association, duly registered in any of the regulating agencies and represented by the trade association's head of agency and at least five (5) member companies;
2. A group of at least five (5) individual companies belonging to the same industry; or
3. A secondary or tertiary cooperative, represented by the head of agency and at least five member cooperatives (as defined in the https://cda.gov.ph)

To be an eligible industry partner, the company must:

1. Be Filipino-owned (at least 60%)
2. Be operating in the Philippines for at least 3 years and be able to provide proof of active compliance with statutory regulations (such as the most recent business registration and business permits)
3. Provide at least 40% of the project budget as counterpart funding (in cash, kind, or person-hours)
4. Commit to adopting the output of the research (by signing a technology adoption certificate). Plans for the use of the proposed technology and the mode of technology transfer after the project must be included and clearly discussed in the business plan.
5. Show how the research output will be adopted

Republic of the Philippines
DEPARTMENT OF SCIENCE AND TECHNOLOGY
PHILIPPINE COUNCIL FOR INDUSTRY, ENERGY AND EMERGING TECHNOLOGY RESEARCH AND DEVELOPMENT

2026 Call for Proposals for 2028 Funding

Funding opportunity template

Funding opportunity title

DOST and PCIEERD Grants-in-Aid (GIA) Program Call for Proposals for CY2028 Funding

Key information

Type of funding	Grant
Funding Agency	Department of Science and Technology DOST-Philippine Council for Industry, Energy and Emerging Technology (DOST-PCIEERD)
Co-funder(s) *External agencies*	Department of Science and Technology (DOST)
Link to the Concept Proposal Submission	http://dpmisv2.dost.gov.ph
Link to the Full blown proposal submission	DOST Project Management Information System (DPMIS): http://dpmis.dost.gov.ph
Link to the PCIEERD Research Database (simple check to avoid duplication)	https://projects.pcieerd.dost.gov.ph

Timeline

Event	Date	Time
Concept Proposals		
Opening date for submission of **Concept Proposals**	March 1, 2026	8:00 A.M.
Closing date	March 15, 2026	5:00 P.M.

Evaluation Period	16 March – 15 April 2026	
Full-blown Proposals *(endorsed concept proposals only)*		
Opening date for submission **of Full-blown Proposals**	16 May 2026	8:00 A.M.
Closing date	31 May 2026	5:00 P.M.
Start of projects	January 2028	

Overview

The Department of Science and Technology (DOST) and the DOST-Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD) are ready to accept research and development (R&D)/Science and Technology (S&T) proposals for **2026**. This Call for Proposals is for specific priority areas identified in the Harmonized National R&D Agenda (HNRDA) 2023-2028, the priorities identified under the Three-Horizon STI Economic Strategy (2025-2028), and PCIEERD's Roadmap and Action Plan (2021-2028) which is clustered into a program agenda called NEXUS or Nurturing Exemplars of Unified Scientific Solutions.

Guided by the DOST mantra ***"Providing Solutions, Opening Opportunities,"*** the DOST-PCIEERD directs R&D and S&T initiatives that will provide solutions and contribute towards an improved innovation system to leverage economic progress through the formulation of sectoral roadmaps (https://pcieerd.dost.gov.ph/road-maps)

Opportunity summary

This funding opportunity encourages S&T collaboration and applied research among Higher Education Institutes (HEIs), government Research and Development Institutes (RDIs), and non-profit S&T networks and organizations seeking funding for their R&D/S&T initiatives.

Who can apply

Any public and private universities and colleges, Research and Development Institutes (RDIs), R&D Consortia, non-profit laboratories, other public or private non- profit S&T institutions located in the Philippines with proven competence may apply for GIA support of DOST and DOST-PCIEERD and its grant-giving units, provided that projects fall under the specific

research areas with overall goal to benefit Filipinos. Non-profit S&T organizations are those, which: (1) are primarily operated for scientific, educational, service, or similar purposes in the public interest; and (2) are not organized primarily for profit. Non-profit organizations engaged in lobbying activities are not eligible to apply.

What we're looking for

Proposals to be submitted and or funded under this announcement must demonstrate the advancement of Science and Technology, alignment to government's economic policy direction and fall under at least one of the DOST-PCIEERD Priority Programs identified in **Annex A**.

Eligible costs
100% of the project cost shall be covered under the Grant while the applicant's organization shall provide at least 15% counterpart funding, in cash/in kind, except for projects involving public good. Only eligible and allowable costs may be used for counterpart fund and/or in-kind contribution (ex. utility costs, office space rental, etc.), as determined by DOST-PCIEERD. The proposal must describe how the applicant will provide the counterpart fund/in-kind contribution and the role that the Grant will play in the overall project.

The requested budget shall be itemized following the DOST Form 4-Project Line-Item Budget. The grant may cover partial or full cost of the project, both direct and indirect costs which shall include personnel services, maintenance and other operating expenses, and capital outlay that are integral part of the project. All expenditure items shall be in accordance with the Unified Account Code Structure (UACS) and relevant provisions of the DOST Memorandum Circular 003 Series of 2025 or the Guidelines for the Grants-in- Aid (GIA) Program of the Department of Science and Technology (DOST) and its Attached Agencies. DOST MC 003_DOST GIA Guidelines_Nov2025.pdf

Capital or infrastructure expenditure is not an eligible cost under the Grant as well as fees and/or stipends associated with Master and PhD studentships. `

How to apply

The concept proposal shall be submitted through the **DOST eProposal System** within the period **01-15 March 2026**. Evaluation of the concept proposals will be from **16 March to 15 April 2026.**

Only those with approved concept proposals are eligible to submit full blown proposals.
The full blown proposals should be submitted through the DOST Project Management Information System (http://dpmis.dost.gov.ph) from **8:00 A.M. of 1 May 2026 - to 5:00 P.M. of 31 May 2026**.

It will not be possible to submit an application to the call after the time mentioned above. Proposals submitted after the deadline will not be considered. Applicants are encouraged to leave enough time for proposal inputting in the DPMIS before the said date.

When submitting your application, please follow these steps:
1. Register and create an account in the DPMIS
2. Log in to your DPMIS account
2. Select Type of Proposal: PCIEERD GIA Program/Project (2028 Funding)
3. Select Classification: New Proposal

The following will automatically be disapproved:

1) Proposals from organizations that are not qualified to submit during this Call;
2) Proposals outside the priority areas of the Council; and
3) Proposals submitted to any other call route/Council/s.
4) Proposals not submitted through DPMIS, i.e., submission of printed copy of proposals, submission sent through email.

Documents Required

As a summary, your application should include the following documents.

1) DOST Proposal Form
2) Supplementary Files
   Workplan
   Endorsement of Head of Agency
   Gender and Development (GAD) Score Sheet
   Letter of Intent/Letter of Cooperation

No additional attachments are permitted.

Document Summaries

Applicants shall follow the DOST GIA Proposal Format for both the Concept Proposal and the Full-blown proposal (R&D or non-R&D, whichever is applicable) which will be accomplished in the e-Proposal portal at http://dpmis.dost.gov.ph Instructions for submission are also available in this site.

Project Concept Proposal

Example of the Project Concept Proposal format

I. Concept Project Proposal Summary Information
   1. Project Title
   2. Project Duration
   3. Estimated Budgetary Requirement
   4. Principal Research Question to be Addressed
II. Project Leader Profile
   1. Name
   2. Position
   3. Organization
   4. Department/Division
   5. Contact Details
   6. Other Ongoing Projects being handled by the Project Leader
III. Project Profile

1. Cooperating Agencies
2. Sites of Implementation
3. R&D Program/Project (Basic or Applied)
4. DOST Pillars Pursued
5. DOST Thematic Areas Covered
6. Project Summary

The concept proposal is assessed based on the alignment with the call priorities and the NSDB or the Needs, Solutions, Differentiation and Benefits. The following guide questions are used during the evaluation:

Guide Question	Where to do simple check, if applicable
1. Aligned with the Call priorities and the roadmap? (N)	https://pcieerd.dost.gov.ph/road-maps
2. Does the proposal solve or partially solve the identified problem? (S)	
3. Does the proposal identify how it is different from existing and completed technologies? (D)	*https://projects.pcieerd.dost.gov.ph for a simple duplication check*
4. Are the benefits identified? (B)	

Detailed R&D Project Proposal Format

Example of a DOST Proposal Format: R&D

I. Project Profile

Program/Project Title - the identification of the Program and the component projects.

a. **Project**- refers to the basic unit in the investigation of specific S&T problem/s with predetermined objective/s to be accomplished within a specific time frame.
b. **Project Leader**- refers to a project's principal researcher/implementer.
c. **Project Duration**- refers to the grant period or timeframe that covers the approved start and completion dates of the project, and the number of months the project will be implemented.
d. **Implementing Agency**- the primary organization involved in the execution of a program/project which can be a public or private entity

II. Co-Implementing and Cooperating Agency/ies

Refers to the agency/ies that support/s the project by participating in its implementation as collaborator, co-grantor, committed adopter of resulting technology, or potential investor in technology development or through other similar means.

III. Site/s of Implementation

Location/s where the project will be conducted. Indicate municipality, district, province, region, and country.

IV. R&D Program Indicates whether the project is basic or applied.

a. **Basic research**- is an experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundations of phenomena and observable facts, without any particular or specific application or use in view.
b. **Applied research**- is an investigation undertaken in order to utilize data/information gathered from fundamental/basic researches or to acquire new knowledge directed primarily towards a specific practical aim or objective with direct benefit to society.

V. DOST Pillars Pursued

Based on the DOST Pillars, indicate which of DOST Pillars will be pursued:
Human Wellbeing
Wealth Creation
Wealth Protection
Sustainability

VI. DOST Thematic Areas Covered (Check all that apply**)**
Learning, Education, and Culture
Health and Wellbeing
Food and Agriculture
Industrial Solutions and Competitiveness Development
Transport and Mobility
Energy and Utilities System
Environment & Natural Resources
Climate, Disaster Resilience, and Human Security
Governance
Others (please specify)

VII. Executive Summary- briefly discusses what the whole proposal is about (in the DPMIS, it should not exceed 300 words).

VIII. **Introduction**- a formally written declaration of the project and its idea and context to explain the goals and objectives to be reached and other relevant information that explains the need for the project and aims to describe the amount of work planned for implementation; refers to a simple explanation or depiction of the project that can be used as communication material.

VIII.1. Rationale- brief analysis of the problems identified related to the project (in the DPMIS, it should not exceed 300 words).

Significance- refers to the alignment to national S&T priorities, strategic relevance to national development and sensitivity to Philippine political context, culture, tradition and gender and development. This should also contain ***good impact statements*** *that outline how the project will address a significant need, its potential contribution to national development, and how it aligns with DOST-PCIEERD's mission of fostering innovation and scientific advancement.*

VIII.2. Scientific Basis- other scientific findings, conclusions or assumptions used as justification for the research

Theoretical Framework- the structure that summarizes concepts and theories that serve as basis for the data analysis and interpretation of the research data.

VIII.3. Objectives- statements of the general and specific purposes to address the problem areas of the project.

IX . Review of Literature

Refers to the following: (a) related researches that have been conducted, state-of-the-art or current technologies from which the project will take off; (b) scientific/technical merit; (c) results of related research conducted by the same Project Leader, if any; (d) Prior Art Search, and; (e) other relevant materials.

X. Methodology

Discuss here the following: (a) variables or parameters to be measured and evaluated or analyzed; (b) treatments to be used and their layout; (c) experimental procedures and design; (d) statistical analysis; (e) evaluation method and observations to be made, strategies for implementation (Conceptual/Analytical framework).

XI. Technology Roadmap (if applicable)

A visual document that communicates the plan for technology. It is a flexible planning technique to support strategic and long-range planning by matching short- and long-term goals to specific technology solutions.

XII Expected Outputs (6Ps)

Deliverables of the project based on the 6Ps metrics (Publication, Patent/Intellectual Property, Products and Processes, People Services, Places and Partnerships, and Policies)

a. *Publications*- published aspect of the research, or the whole of it, in a scientific journal or conference proceeding for peer review, or in a popular form.
b. *Patents/Intellectual Property*- proprietary invention or scientific process for potential future profit.
c. *Products and Processes*- invention with a potential for commercialization.
d. *People Services*- people or groups of people, who receive technical knowledge and training.
e. *Places and Partnerships*- linkage forged because of the study.
f. *Policies*- science-based policy crafted and adopted by the government or academe as a result of the study.

Public Engagement for S&T Projects - interactions, activities, or initiatives involving individuals, communities, or the public primarily intended to communicate and raise awareness of the S&T initiatives of the Council.

Note:

1. DPMIS accepts only 6Ps. For Public Engagement for S&T Projects, input it under People Services if it contains trainings; under Publications if it contains social media materials, etc

2. Ensure content is aligned to the DOST Form 5 Workplan Section B – Expected Outputs

Potential Outcomes (Refer to DOST M&E Guidelines)

- **MEASURES THE CHANGE THAT HAS OCCURED AS A RESULT OF THE PROJECT**

Innovation Stimulated
Technology adoption are accelerated/sustained
Improved productivity
Resiliency to Disaster
More responsive to the environment

Potential Impacts (Refer to DOST M&E Guidelines)

- **MEASURES THE BROADER CHANGES THAT HAS OCCURRED WITHIN THE SOCIETY, ECONOMY AND ENVIRONMENT**

Economic Growth / Industry Competitiveness
Improved Environmental Condition
Socio-cultural

In the DPMIS, Social & Economic Impacts has two (2) separate fields required for input.

XIII. **Target Beneficiaries**
Refers to groups/persons who will be positively affected by the conduct of the project.

XIV. **Sustainability plan (if applicable)**
Refers to the continuity of the project or how it shall be operated amidst financial, social, and environmental risks.

XV. Gender and Development (GAD) Score
Refers to the result of accomplishing GAD checklists for project monitoring and evaluation/project management and implementation to highlight the contribution of the project in the achievement of the objectives of Republic Act 7192, "Women in Development and Nation Building Act," interpreted as gender-responsive, gender-sensitive, has promising GAD concepts, or GAD is invisible.

XVI. **Limitations of the Project**
Refer to restrictions or constraints in the conduct of the project.

XVII. List of Risk and Assumptions

Risks - refers to an uncertain event or condition that its occurrence has a negative effect on the project.

Assumption- refers to an event or circumstance that its occurrence will lead to the success of the project.

Note: Ensure content is aligned to the DOST Form 5 Workplan Section C – Risks and Assumptions

XVII . Literature Cited
An alphabetical list of reference materials (books, journals and others) reviewed. Use standard system for citation.

XIX. **Personnel Requirement**
Details on the position of personnel to be involved in the project, percent time devoted to the project, and responsibilities.

XX Budget By Implementing Agency
Personnel services (PS), maintenance and other operating expenses (MOOE), and equipment outlay (EO) requirement of the project by implementing agency for Year 1 and for the whole duration of the project. Please refer to the DOST-GIA Guidelines for the details (Section IX.B of DOST Administrative Order (A.O.) 011, s. 2020).

a. **PS**- total requirement for wages, salaries, honoraria, additional hire and other personnel benefits.
b. **MOOE**- total requirement for supplies and materials, travel expenses, communication, and other services.
c. **EO**- total requirement for facilities and equipment needed by the Program.

Notes:

- DPMIS is set for 2026 Salary rates (Refer to DOST AO 958 Series of 2024 – CYs 2024-2027 Prescribed Salary Rates for DOST GIA Personnel)
- Include 20% counterpart funding or in-kind contribution from the implementing agency per year.
- If the proposed LIB contains equipment outlay, include the insurance for the equipment outlay as part of the 15% implementing agency counterpart funding.

XXI. Other Ongoing Projects Being Handled By the Project Leader
List of ongoing projects being handled by the Project Leader funded by the DOST-GIA Program and other sources, and the accompanying responsibilities relevant to the project.

XXII Other Supporting Documents
These include related information on the proposed program/project like, resumes or curriculum vitae, support letters from relevant agencies/organizations, market supply/demand projections, etc. Below are explanations of required information, which should be attached in the proposal. These will also be submitted through the e-Proposals portal.

i. **Workplan**
Describe specific activities and/or methods to be undertaken and estimated timeline for each task.
ii. **Endorsement of the Head of Agency**
iii. **Gender and Development (GAD) GAD Score Sheet**
iv. **Letter of Intent/Letter of Cooperation** from interested adopters of the project results (specifying role/s and monetary/in-kind contribution in the project)

How we will assess your application

For Capsule Proposals:

The following guide questions are used during the evaluation:

Guide Question	Where to do simple check, if applicable

1. Aligned with the Call priorities and the roadmap? (N)	https://pcieerd.dost.gov.ph/road-maps
2. Does the proposal solve or partially solve the identified problem? (S)	
3. Does the proposal identify how it is different from existing and completed technologies? (D)	*https://projects.pcieerd.dost.gov.ph for a simple duplication check*
4. Are the benefits identified? (B)	

For Full Blown Proposals:
A. Review and Selection Process

Proposals shall be evaluated according to a set of criteria for each level of evaluation: Division Level, PCIEERD Management Team (PMT) level, Technical Panel (TP) level, Governing Council (GC) level, and the DOST Executive Committee (EXECOM) level (for proposals for DOST GIA funding) as shown below. Applicants should directly and explicitly address these criteria as part of their proposal submission.

Criteria for PCIEERD-GIA Program funding:

1. Scientific Merit
Contribution to the advancement of knowledge and understanding in the field of Science & Technology.
The research is at par with the existing studies; cutting edge; world class research.
Sound scientific basis to generate new knowledge/innovative technology.
Will contribute to the enhancement/development of skills and expertise in the field/discipline.

2. Methodology
The procedures are clear, well-organized, well-described and based on a sound rationale.
The proposed methods and results are valid, replicable and reliable.
The proposed activities are reasonable to attain its expected outputs.

3. Financial Soundness
The proposed budget is reasonable in the conduct of the research. The expense items sought are appropriate and necessary.
There are adequate counterpart resources available (e.g. expertise, facilities) to carry out the research.

4. Timeframe
The duration of the project and its activities are reasonable.
The workplan is doable in a given timeframe.
The risk management plan was established to avoid delays in the project implementation.

5. Environmental Impact
The project will not pose a significant adverse effect on the environment and/or public health.
Will adhere to Circular Economy Framework and practices

6. Other Issues

Compliance with regulatory requirements is necessary in the conduct of research.
Ethical issues (i.e. do not harm, informed consent, voluntary participation, privacy, anonymity, confidentiality) are properly addressed.

7. Sustainability
The likelihood that institutional, financial, and other resources are sufficient to sustain the project's outcome in a sustainable way. Also, there are potential partners and techno-takers to be involved in the project.

- Research utilization plan under methodology
- Sustainability or business plan particularly those with market potential
- Letter of undertaking / commitment specifying roles/responsibilities and counterpart funding from potential partners, target users or techno-takers

8. Socio-economic Impact
Potential of project to create/provide/generate employment.
Potential to Increase income and productivity
Ability to address any current/pressing national problem, among others, are specified and quantified

9. Marketability
Determine current and potential market demand
Has identified specific/potential end-users
Explore/Create new markets for the resulting product/process/service are specified
Advantage over existing products/services in the market
Potential adoption/use of the industry (manufacturer) and other partners

10. Plans for Research/Project Results Utilization
Plans on how R&D results will be used by the potential end user/s or adopters are defined
Addresses strategic needs/value
Sustainability plan for the resources generated and capacity built from the project

Criteria for Evaluation of Proposals submitted under the Emerging Technology Sectors

A separate set of criteria for evaluation is adopted for projects and programs submitted under the Emerging Technology sector to be more appropriate compared with the existing criteria used for other sectors. This is considering that the technologies are generally new and development and applications are still unrealized.

1. Significance of Research (20%)
   Alignment of the project to global emerging trends
   Contribution of the project to immediate needs
   Potential of the project to address national and local needs
2. Impacts (35%)
   Knowledge Impact
   Environmental Impact
3. Innovation and Results Utilization (40%)
   Technology Roadmap/Development Pathway
   Feasibility, Operations, and Sustainability

Plans on the Use of Research Results
Target Technology Readiness Level upon completion of the proposed Project

4. Project Leader's Track Record (5%)
   R&D Projects Led
   R&D Projects Participated
   R&D Projects Successfully Delivered

Additional Criteria for DOST-GIA Program Funding:

1. Relevance
Aligned to national S&T priorities, strategic relevance to national development and sensitivity to Philippine political context, culture, tradition and gender and development.

2. Technical Scientific Merit
Sound scientific basis to generate new knowledge or apply existing knowledge in an innovative manner.

3. Budget appropriateness
The proposed budget is commensurate to the proposed work plan and deliverables

4. Competence of Proponent
Proponent's expertise is relevant to the proposal and with proven competence to implement, manage and complete R&D programs/projects within the approved duration and budget

Other Factors
The Approving Authorities, the GC and/or EXECOM, based on the rankings and preliminary recommendation of the PMT, will make final funding decisions. The Approving Authorities may also consider programmatic priorities and geographic diversity of grants.

Contact

DOST-PCIEERD Project Managers are available to provide appropriate assistance to potential applicants interested in competing for this Call for Proposals. This may include assistance to potential applicants in determining eligibility of the applicant or the applicant's proposed project for funding, questions about administrative issues relating to the submission of a proposal, and clarifications on the announcement.

Contacts:
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Industry Sectors:

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Science Communication Sector:
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Special Concerns:
Environment: Ms. Mary Grace G. Buenavides
Creative Industry: Furniture, Jewelry : Ms. Mary Grace G. Buenavides
Creative Industry- Animation, Game, and Film: Ms. Edna C. Nacianceno;

Impact Assessment: Ms. Grace F. Estillore, gfestillore@pcieerd.dost.gov.ph

For **general or inquiries related to the Call Guidelines**, the applicant may contact:

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gfestillore@pcieerd.dost.gov.ph
Ms. Carlota P. Sancho, Policy Coordination and Monitoring Division
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Additional information

PCIEERD Eligibility Criteria.pdf
Evaluation Criteria Emerging Tech I-24-0326-16 2 (3).pdf
PCIEERD Evaluation System PMT Score.pdf
PCIEERD Evaluation System TP Score.pdf
PCIEERD_GC_Scoresheet.pdf

List any supporting documents you will provide

References for PCIEERD-supported projects:
http://projects.pcieerd.dost.gov.ph/
https://pcieerd.dost.gov.ph/library/annual-reports
https://pcieerd.dost.gov.ph/supported-programs-projects/supported-programs-and-projects/on-going-projects

List any related content links

DOST MC 003 series of 2025 Guidelines for the Grants-in-Aid (GIA) Program of the Department of Science and Technology (DOST) and its Attached Agencies. DOST MC

003_DOST GIA Guidelines_Nov2025.pdf

AO 508 S. 2013 Hiring of Staff - Adoption of a Minimum Qualification Standard.pdf

DOST AO 958, series of 2024 DOST-GIA-Prescribed-Salary-Rates-Year-2024-2027_SO-958-.pdf

DOST Administrative Order (AO) No. 005.s.2025 Revised Rules on Personal Foreign Travel of DOST Personnel I-25-0925-30.pdf

I-24-0604-43 7Ps valuation (1).pdf I-25-1017-21 7 Ps (1).pdf

DOST Forms (downloadable versions from the DPMIS):
https://dpmis.dost.gov.ph/index.php/transparency/downloads/category/2-dost-forms

A.O. 014, S. of 2019 DOST M&E Protocol DOST_ME_Handbook_Body.pdf

Stakeholders Consultations Stakeholders' Consultation 2025.xlsx

TABLE OF CONTENTS

OVERVIEW **1**

CALL THEMES

I. Emerging Technology Development in the Philippines **3**

1.1. Advanced Materials and Nanotechnology Sector 3
1.1.1. Advanced Materials and Nanotechnology 3
1.1.2. Additive Manufacturing 4

1.2. Optics and Photonics, and Nuclear R&D Sector 6
1.2.1. Optics and Photonics, and Nuclear R&D Program 7

1.3. Artificial Intelligence (AI) Sector 8
1.3.1. AI Pinas: AI Enabling Solutions for Emerging Needs 8

1.4. Information and Communications Technology (ICT) Sector 11

1.5. Industry 4.0 12

1.6. Creative Industry Sector (Game, Animation, and Film Cluster) 14

1.7. Quantum Technology 16

1.8. Geospatial Technologies 18

II. Energy and Utilities Systems Technology **22**

2.1. Intelligent River and Water Management 22

2.2. Resilient and Smart Construction Solutions for Infrastructure Modernization 25

2.3. Transportation 28

III. Industrial Technology **32**

3.1. Food Sector 32
3.1.1. Food Innovation Program 34
3.1.2. DOST Integrated Food Safety Program 36
3.1.3. DOST Halal S&T Program 37

3.2. Process Sector 38
3.2.1. Natural Product Program 39
3.2.2. Chemical and Biological Manufacturing and Allied Industries Program 40
3.2.3. Textile Program 43
3.2.4. Agro-Industrial Program 45

3.3. Mining and Minerals Sector 47
3.3.1. Value-adding of Metallic Minerals Program 48
3.3.2. Value-Adding of Non-Metallic Minerals 58
3.3.3. Technologies in Support to Environmental Protection Conservation and Rehabilitation of Mined-out Area 69

3.4. Metals and Engineering Sector 74
3.4.1. Machining and Fabrication 75

3.5. Environment Sector 78
3.5.1. National Research and Development Program for the Prevention and Control of Water Pollution 79
3.5.2. National Research and Development Program for the Prevention and Control of Air Pollution 81
3.5.3. Innovative Solutions to Solid Waste Management 82
3.6. Creative Industry Sector 84
3.6.1. Footwear Program 86
3.6.2. Furniture Applications Program 87

IV. Science Communication 88
4.1. Science Communication for Innovation Program 89
Research Extension to Accelerate Communication
4.1.1. Development of Information & Dissemination Activities 88
4.1.2. Production of IEC Materials 90

V. Impact Assessment 95
VI. Science for Change Program (S4CP) 97

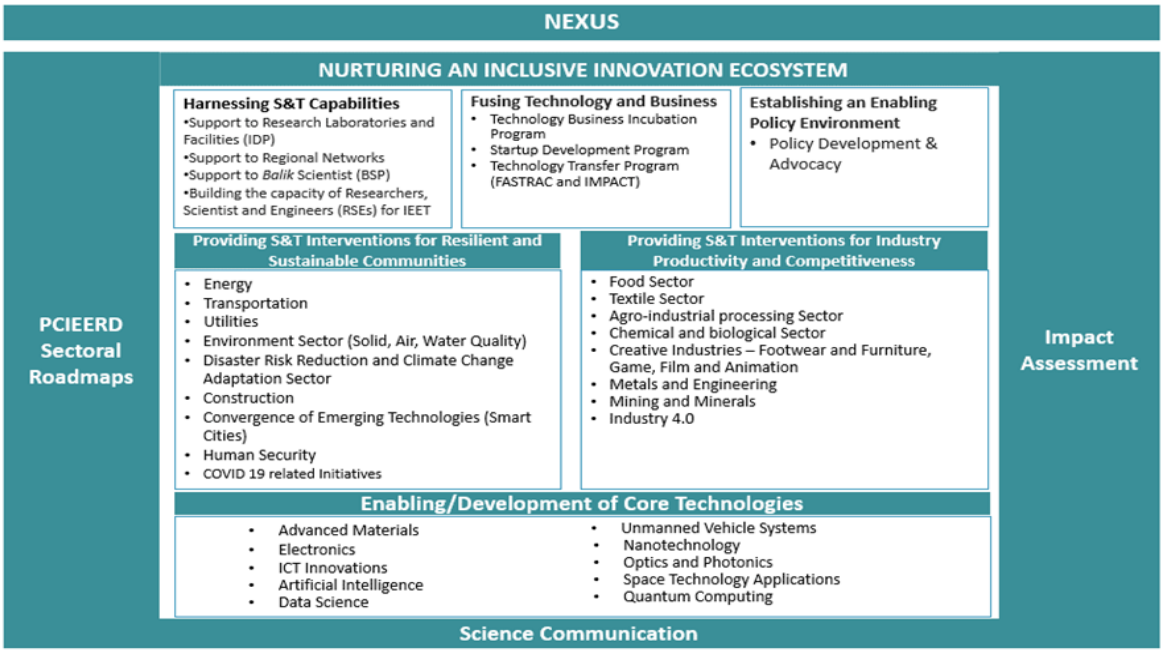
ANNEX A

2026 Call for Proposals for 2028 Funding

Overview

The Call for Proposals by DOST-PCIEERD is aligned with *AmBisyon Natin 2040,* from which the DOST Strategy Framework for 2023-2028 is derived. The priorities identified under the Three-Horizon STI Economic Strategy (2025-2028) are also integrated in the Call.

The Call also aligns with the Harmonized National R&D Agenda (HNRDA) for 2022-2028 as well as the PCIEERD's Roadmap and Action Plan (2021-2028) which is clustered into a program agenda called NEXUS or Nurturing Exemplars of Unified Scientific Solutions.



The NEXUS consists of three essential pillars, *i.e.*, Harnessing S&T Capabilities, Fusing Technologies and Business, and Establishing an Enabling Policy Environment. There are complementing components driven by S&T initiatives which contribute to the rationale and aspirations of the program. These are:

1. Providing S&T Interventions for Resilient and Sustainable Communities- This program provides for the development of scientific and technological interventions that contribute to resilient and sustainable communities by considering and addressing multiple human needs, reflecting the interdependence of economic, environmental, security and social issues.

2. Providing S&T Interventions for Industry Productivity and Competitiveness - This program provides for the development of scientific and technological interventions that contribute to the industries' productivity and competitive advantage

3. Enabling/Development of Core Technologies - To spur innovation and transformation in the country, PCIEERD provides support and S&T interventions for the development of enabling core technologies and solutions for the emerging industries, energy, and infrastructure sectors to solve the challenges of today and tomorrow. PCIEERD will continuously harness and develop new and emerging technologies on the horizon.

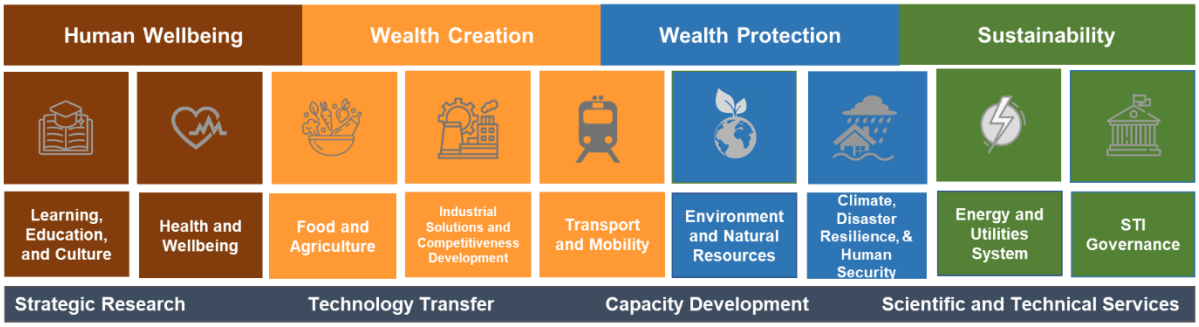
4. Science Communication for Innovation - Communication of scientific information with potential users and the public is an important aspect of science and technology. Only until results of science are communicated and shared accordingly will research be deemed complete. As Science Communication (Scicom) is a rapidly expanding discipline, having both practical and theoretical features that are critical to today's developmental challenges, PCIEERD provides support for undertakings towards an integrated, inclusive, and innovative approach of the said discipline in the country. Interventions and activities in communicating science will cut across the whole R&D process of PCIEERD-funded projects to include the relative pillar of science communication in accordance with its nature.

5. Impact Assessment- This program provides for the determination of the effectiveness and success of the significant investments made by the Council on research and development (R&D), information dissemination and technology transfer activities and initiatives, and assessing the significance of changes brought about by those activities. Impact assessment studies on PCIEERD-funded or monitored projects are conducted to determine and measure the changes, both intended and unintended, that result from research, development, and extension.

The 2026 Call also supports the 4 Pillars of DOST which goal is to strengthen and advance science, technology, and innovation (STI) in the Philippines, ensuring responsive, people-centered, and technology-enabled public services and governance. This year's R&D call prioritizes nine thematic areas under the DOST's 4 Pillars: Human Wellbeing, Wealth Creation, Wealth Protection, and Sustainability.

AMBISYON NATIN 2040

Matatag, Maginhawa, at Panatag na Buhay Para sa Lahat



For each of the DOST four pillars, DOST-PCIEERD intends to support R&D programs that will contribute to the attainment of the following:

- On Human Well-being - DOST PCIEERD will be supporting programs on food security, water security and environmental protection, energy security, and human resource development.
- For wealth creation - increase economic development, job creation, and industry competitiveness.
- For wealth protection - R&D programs on climate and disaster resilience will ensure that minimal resources are shielded from calamities.
- On sustainability - R&D programs will be geared towards facilities upgrading, digital transformation, and smart and sustainable communities.

Call Themes

I. Emerging Technology Development in the Philippines

The Call for Proposals on Emerging Technologies aims to strengthen and vigorously advance science, technology, and innovation (STI) in the Philippines, and ensure sustainable, responsive, people-centered, and technology-enabled public services and governance.

Stakeholder consultations with representatives from academia, research and development institutions (RDIs), government institutions, and private sectors, held in 2024 and 2025, updated the current roadmaps of the Emerging Technology Development Division (ETDD) and determined its priorities for funding in CY 2028.

Advanced Materials and Nanotechnology Sector

Call Rationale

Advanced materials are at the forefront of innovation, enabling breakthroughs in energy, semiconductors and electronics, and sustainable manufacturing applications, among others. These materials not only enhance the performance and functionality of existing technologies but also pave the way for entirely new applications. Research and Development (R&D) in Advanced Materials is a cornerstone of the Philippines' strategy to transition from a consumer of technology to a high-value producer. In late 2025, the significance of this field spans economic resilience, national security, and environmental sustainability. By investing in advanced materials, the Philippines is moving beyond its traditional role as a source of raw minerals and becoming a hub for "value-added" manufacturing. The Philippines, with its growing R&D ecosystem, is at an advantage in harnessing its capabilities in materials science to address both local and global challenges, such as energy sustainability and manufacturing resilience.

Call Objective

- Accelerate the development of emerging and advanced materials to address societal needs and economic opportunities.
- Promote sustainability by leveraging green synthesis methods, bio-inspired designs, and sustainable materials.

- Enhance local industries through the development of innovative applications in energy storage, flexible electronics, semiconductors, virology, and manufacturing, among others.

Call Scope

R&D on the following areas shall be supported:

Advanced Materials and Nanotechnology (10 projects, P20 M each)

- Sensing Materials (carbon quantum dots, thermoelectric and thermoresistive materials, etc.)
- Materials for semiconductor and electronics applications (wide bandgap semiconductor, thermal management materials, materials for 5G and 6G applications, etc.)
- Packaging materials for virology applications
- Materials informatics towards energy applications
- Quantum materials and metamaterials for computing, sensing and energy applications (New materials enabling next-generation chips, sensors and energy-efficient computing, including quantum and topological materials and metamaterials for photonics, antennas and advanced devices)

Plasma R&D Program (NICER) (3 projects, P20M each)

- Optical Coating
- Energy Harvesting and storage
- Coating for automotive and aerospace

Specific Requirements

- Proposals must demonstrate strong scientific and technological merit and align with the funding priorities listed above.
- Collaboration between academic institutions, government agencies, and industry partners is highly encouraged.
- Projects should outline clear deliverables, timelines, and potential for commercialization or industry adoption.
- Ensure that the research output is planned out by submitting a clear technology commercialization pathway.

PCIEERD will fund project for a maximum of three (3)-year duration depending on the scope of work being proposed.

Additive Manufacturing

Call Rationale

Additive Manufacturing (AM), also known as 3D printing, is revolutionizing traditional production processes, enabling rapid prototyping, custom manufacturing, and resource-efficient fabrication. Since the establishment of the Advanced Manufacturing Center (AMCen) in DOST in 2021, the

sector has transitioned from foundational to strategic expansion phase with the following milestones:

- Operationalization of the Fabrication and Prototyping Laboratory in MIRDC and Materials Development Laboratory in ITDI in 2021
- Conduct of the first Philippines Conference on Additive Manufacturing (PhilCAM) and stakeholder's forum in 2022
- Evolution into the Central Hub for Advanced Manufacturing R&D in the Philippines (CHAMP) Program in 2023, which resulted in notable development of feedstock and prototypes for manufacturing, medical, consumer goods, construction, and education sectors
- Establishment of 18 satellite laboratories in the regions
- Partnership with academic institutions, industry and private companies, and government agencies
- Conduct of roadmap updating and an Additive Manufacturing Conference-Workshop in 2024, co-organized by MIRDC, ITDI, and PCIEERD and was participated in by researchers from the government, academe, industry, experts/ resource persons, among others
- Sending of six (6) researchers to the AI training in Additive Manufacturing in the United States under the mentorship of Dr. Rigoberto C. Advincula of the University of Tennessee, Knoxville
- Hosting of the following key events in 2025: AM Technical Working Groups Roadmapping, ISO/TC 261 – ASTM Joint Committee Meeting, and Asian Conference on Advanced Manufacturing

Moving forward to 2027, PCIEERD aims to leverage the established capabilities and facilities to address national concerns through high-impact and sustainable AM solutions. By fostering innovation in AM processes, materials, and applications, the program seeks to enhance the country's manufacturing capabilities, promote sustainability, and support socio-economic development in key sectors.

Call Objective

- To support R&D for innovative design and fabrication processes with increased Technology Readiness Levels
- To strengthen domestic supply by continuing the development of locally sourced sustainable materials and feedstocks, thus reducing import dependence
- To continue establishing national certification standards for AM
- To transition from prototyping to mass-production of solutions intended to address the needs of the manufacturing, consumer goods, and construction sectors using AM

Call Scope

Proposals to be submitted should develop technologies aligned with the call scope within two to three years, addressing one or more of the following priority areas:

- Manufacturing
    - Aerospace
        - Development of satellite components (TRL 4)
        - Development of courses on design for AM for industry personnel

        - Development of a lightweight monolithic cube satellite 2U frame (TRL 4)
    - Automotive
        - Development of fixtures for automotive quality assurance
        - Development of fixtures for automotive assembly
    - Defense
        - Development of localized/optimized firepower through the application of 3D printing
        - Conduct of national training needs assessment for AM in defense
        - Development of platforms, structures, materials, and products for unmanned systems
    - Semiconductor and Electronics
        - AM-enabled production of microelectronic components and packaging
        - Modality/techniques for adoption of 3D printed polymer/metal parts like tooling, spare parts, among others
- Consumer goods
    - Recycling and reformulation of 3D printing wastes (polymer, metal, ceramic, composites)
    - Development of 3D-printed membrane for desalination and energy generation and storage applications
    - Development of new AM feedstock with advanced functionalities and applications
- Construction
    - Material innovation
        - Development of materials database
        - Development of low-carbon and environment-adaptive 3D concrete panels
        - Development of mix formulations of locally sourced materials and waste as alternative green cementitious materials
        - Development of bio-based additive construction materials
        - Investigation of properties of fresh/wet materials before solidification, hardened materials, geometric conformity, and factors affected by applications
    - Design and structural optimization
        - Optimization of geometric design patterns in 3D printed reinforcement for enhanced load distribution
        - AI-driven real-time parameter optimization for 3DCP in tropical climate
        - Structural performance analysis of 3D printed load-bearing walls using different layering patterns and materials
        - Integration of 3D printed reinforcements in modular precast concrete elements for rapid construction

Specific Requirements:

- Proposals must demonstrate strong scientific and technological merit and align with the funding priorities listed above.
- Collaboration between academic institutions, government agencies, and industry partners is highly encouraged. To ensure that the research output will be utilized by the target industry/ adaptor, a letter of interest together with a three to five-year technology pathway must be submitted.
- Projects should outline clear deliverables, timelines, and potential for commercialization or industry adoption.

- Ensure that the research output is planned out by submitting a clear technology commercialization pathway.

PCIEERD will fund **six (6) projects** and shall fund **P20 Million** each project per year depending on the scope of work being proposed.

Optics and Photonics, and Nuclear R&D Sector

Call Rationale

Optics and Photonics are transformative technologies with wide-ranging applications in imaging, communications, laser science, and energy. They play a vital role in advancing industries such as defense, healthcare, telecommunications, and renewable energy. This program seeks to harness the potential of optics and photonics to address national priorities, foster innovation, and position the Philippines as a competitive player in global technology development.

Nuclear Science R&D offers unparalleled opportunities for advancements in materials science, industrial applications, and research. By developing facilities and R&D projects focused on low-energy electron beams and neutron imaging, the program supports the establishment of foundational nuclear technologies for scientific, industrial, and societal benefits.

Call Objective

- Advance R&D in optics, photonics, and nuclear science to create high-value solutions for defense, communication, energy, and industrial applications.
- Establish state-of-the-art facilities to serve as national hubs for innovation and capacity building in the country.
- Enhance local industries and promote sustainable development through cutting-edge research, technology development, and knowledge transfer.
- Foster international collaboration and increase the Philippines' visibility in global science and technology innovation.

Call Scope

Proposals to be submitted should develop technologies aligned with the call scope within 2-3 years.

Proposals to be submitted should be aligned to the indicators specified under the **Optics and Photonics R&D Roadmap** including the following priority topics:

- Optics and Photonics
  - Photonics-integrated circuits (PICs) (5G and 6G applications, etc.)
  - Terahertz R&D (advanced telecommunications, non-destructive testing for industry applications, etc.)
  - Imaging (non-destructive imaging, metrology, and structural imaging, etc.)

- Nuclear Science R & D
  - Neutron Imaging applications

Specific Requirements

- Proposals must demonstrate strong scientific and technological merit and align with the funding priorities listed above.
- Collaboration between academic institutions, government agencies, and industry partners is highly encouraged.
- Projects should outline clear deliverables, timelines, and potential for commercialization or industry adoption.
- Ensure that the research output is planned out by submitting a clear technology commercialization pathway.

Artificial Intelligence (AI) Sector
AI PINAS: AI Enabling Solutions for Emerging Needs

Call Rationale

Artificial Intelligence is a transformative force reshaping industries, enhancing government services, and addressing global challenges. With its rapid evolution, AI holds the potential to improve economic productivity, ensure national security, and advance the Philippines' technological standing.

From 2022-2025, some of the notable R&D Projects supported by DOST and DOST-PCIEERD are as follows:

- SpaceBetweenUs: A Computer Vision Application for Physical Distancing Monitoring in Public Areas
- AI Robotics for autonomous missions – Autonomous Societally Inspired Mission Oriented Vehicles (ASIMOV) Program (HAWKS and ROAMER)
- Philippine Sky Artificial Intelligence (SkAI-Pinas) Program
- AI for DRR and Infrastructure
- AI-TEWS: Development of an AI-assisted Thunderstorm Early Warning System from Analysis of Doppler Radar Data
- Intelligent Structural Health Monitoring via Mesh of Tremor Sensor
- Cost-effective Technology for Monitoring and Quantifying Benthic Area Covered by Marine Litter in Shallow Coastal Areas
- Development of a CNN and RNN Topology for Impedance Spectroscopy Analysis
- Unistar Automated Repossessed Motorcycle Assessment System
- Development of Multi-lingual Chatbot for Health Monitoring of Public-School Children
- Design and Development of Intelligent Traffic Control and Management System
- Diachronic Representation and Linguistic Study of Filipino Word Senses Across Social and Digital Media Contexts
- A Lightweight Edge Computer Vision Solution for Smart and Efficient Traffic Management
- Digital Reinforcement to Enable AI (Artificial Intelligence) to Maximize Solutions in BJMP Region X
- Development of a Meranaw Speech Corpus
- Nexus for Advanced Risk Reduction and Analytics System for PNP-COCPO
- COULIGLIG: Cooperative Unified Logistics using Intelligent Grouped Robots
- Advancing Computing, Analytics, Big Data and Artificial Intelligence in the Philippines (ACABAI-PH) Program.
- aiRack: AI-Driven Hybrid-Powered Smart Data Cabinet with Intelligent Thermal and Power Management for Sustainable IT Operations (approved for 2025 funding)

- DepthSeek: Development of an Autonomous Underwater Vehicle with Vision-guided Navigation and Acoustic Communication (approved for 2025 funding)

In terms of facilities and services, AI data centers with high-performance computing (HPC) capabilities were established in selected higher education institutions (HEIs), namely CarSU, DLSU, UP Diliman, UP Los Baños, UP Mindanao, DOST-ASTI, USTP, and MSU-Naawan. The completed SkAI-Pinas Program developed an open data-sharing platform and AI R&D infrastructure, which now serves as the foundational platform for further enhancements under the ACABAI-PH Program.

On the science and technology (S&T) policy front, a Memorandum of Understanding (MOU) between the Department of Science and Technology (DOST) and the Bangko Sentral ng Pilipinas for the *"Banking Through Responsible and Innovative Technology (BRITE) Program"* was approved and signed by both parties in 2025.

In terms of capacity building, DOST supported various initiatives beyond the series of trainings conducted in previous years. These included PCIEERD's Online Training on Multi-Tasking AI for ASEAN Member States in 2022 and the First AI PINAS R&D Conference–Workshop held in March 2023. The conference-workshop served as a venue for researchers from higher education institutions and R&D institutions, as well as representatives from government, private, and public sectors, to share AI R&D initiatives, review the AI roadmap, and develop R&D proposals for potential funding. In February 2025, ten (10) participants selected by DOST-PCIEERD attended the UK–Alan Turing Institute AI Governance Workshop, which aimed to strengthen the Philippines' capacity to govern artificial intelligence through a tailored knowledge and capacity-building program for senior stakeholders from government, academia, and industry. As a follow-up, the Open Data Institute (ODI) Workshop on Data-Centric AI Governance with DOST was conducted in March 2025 to introduce key concepts in data ecosystems, data-centric AI, and ecosystem mapping, with the objective of strengthening data governance and AI development in the Philippines.

In May 2025, the Philippines formally approved the National Artificial Intelligence Strategy (NAIS-PH), providing a roadmap for a whole-of-nation approach to harnessing AI for inclusive innovation, improved governance, community upliftment, and the development of globally competitive industries. Following the approval of the NAIS-PH Framework, DOST, together with DOST-PCIEERD, conducted the First National AI Stakeholders' Conference in October 2025, themed *"NAIS-PH in Motion: Shaping the Future of an AI-Powered Philippines"*. The conference aimed to generate actionable recommendations for the effective implementation of the NAIS-PH.

This call emphasizes:

- Development of AI solutions tailored to local contexts and challenges, including government operations, banking, and cybersecurity among others;
- Exploration of advanced AI platforms and their transformative potential in areas such as generative AI, federated AI, and swarm intelligence;
- Strengthening the integration of AI into robotics and advanced language models to broaden their applications, particularly for underrepresented and endangered Philippine languages; and
- Advancing the country's technological capabilities, enhancing public services, and supporting innovation-driven growth through sustained AI R&D in alignment with the NAIS-PH.

Objectives

- Advance machine learning and AI solutions to address critical needs in government, finance, and cybersecurity, among others.
- Explore emerging AI platforms to develop transformative applications and enhance the Philippines' R&D capacity.
- Enhance large language models (LLMs) to preserve Philippine languages, improve multilingual capabilities, and enable the development of specialized AI applications.
- Strengthen cybersecurity resilience through AI-driven threat detection, prevention, and automated response mechanisms.
- Build national expertise and robust infrastructure to support widespread AI adoption and innovation.

Scope

Proposed projects must develop technologies on the following priority areas with specific applications that will help address pressing national problems.

The proposal should support applications on the following topics:

1. AI Discovery Grants Program
Maximum Budget Allocation: Php 5M per proposal
Target Number of Project/s to be Funded: 10

The AI Discovery Grants Program supports early-stage and exploratory research and development (R&D) initiatives in the field of Artificial Intelligence (AI). It is designed to fund proof-of-concept studies and academic research that investigate innovative AI methods, frameworks, and applications. Eligible projects may involve the development of AI models, algorithms, or prototype systems that demonstrate technical feasibility, address local or sector-specific challenges, or contribute to foundational AI knowledge. Proposals should clearly articulate their potential for future implementation, scaling, or integration into broader digital ecosystems. Priority R&D focus areas include, but are not limited to, the following:

- Public Sector & National Development
- Industry & Emerging Technologies
- Data, Trust & Governance
- Cross-Cutting / Enabling AI platforms
- Cybersecurity
- Finance
- Creative Industries
- Education Technology

2. Beyond Words: Advancing Large Language Models (Directed)
Maximum Budget Allocation: Php 30M per program proposal
Target Number of Project/s to be Funded: 2-3 component projects

Development and application of Large Language Models (LLMs) with a focus on:

- Corpus and LLM Platform for KWF-Targeted Languages to build datasets and models for Philippine languages.

- Enhancing LLMs' Abilities for Underrepresented or Endangered Languages to preserve cultural heritage and linguistic diversity.
- Building Stronger Cross-Lingual and Multilingual Capabilities to improve LLMs' ability to operate in diverse linguistic environments.
- Applications of LLMs in Specialized Domains to develop solutions for education, healthcare, and other sectors.

Specific Requirements

To ensure that the research output will be utilized by the target industry or local regulatory agency, a letter of support / commitment / collaboration must be secured. The proponent should be able to secure training data sets from the target partner institution.

For the LLM, the identified proponents must have answered the survey, attended the Focus Group Discussion (FGD) conducted by DOST-PCIEERD, and demonstrated active participation in these initiatives.

Information and Communications Technology (ICT) Innovation

Call Rationale

Information and communication technologies (ICT) are key enablers of innovation and encompass a broader array of activities. The overall strategies outlined in this roadmap are fundamentals in attaining the Networked Society. The key technology trends or R&D solutions that will stimulate innovations within the ICT industry in the coming years will create new value streams for consumers, government, industry and society. A technology-enabled ecosystem is made possible through a universal, horizontal and multipurpose communications platform. The R&D technologies in ICT Innovations is combined with the next generation of networks such as 5G provide support to IoT, creation of cyber driver dynamic content, retrieval and analysis, among other applications.

From 2021 – 2025, DOST and the council supported ICT Innovation projects such as:

- i-Drip (IoT-Based Dispenser for Real-time Intelligent Pour) an IoT-Based Real-Time Control and Monitoring System for Smart Beverage Dispenser) in 2021.
- Stabilization and Strengthening of Network Infrastructure to Support the DOST Information System (DOST IS)
- Development and Operationalization of the DOST Geospatial Analytics and Technology Solutions (GATES) Program
- AgilaCom: A Multi-Communications Integrated System (approved for 2025 funding)

In terms of facilities and services, the ongoing GATES Program aims to enable the DOST to fully utilize the vast geospatial data generated by its agencies and harness these resources through advanced technologies—such as Artificial Intelligence (AI) and machine learning applications, business intelligence and predictive analysis – for data-driven decision making, towards the achievement of the DOST Strategic Plan 2023-2028 Outcome Pillars.

Call Objective

The main objective of this call is to support research and development projects for ICT innovations, specifically to:

- Strengthen national ICT capabilities through advanced R&D in computing, connectivity, and cybersecurity.
- Enhance data sovereignty and management by developing localized cloud computing and archiving solutions.
- Innovate connectivity solutions to address challenges in wave spectrum utilization and communication efficiency, particularly with 5G and emerging technologies.
- Enable local and global competitiveness by supporting projects that address strategic national ICT priorities.

Proposals shall address the needs and strengthen the capabilities of the local industry in terms of facilities and services, human resources, R&D technologies, and/or S&T policies.

Call Scope

This call targets to support applied research projects on the following topics:

1. Next-Generation Connectivity and Communication Technologies
Maximum Budget Allocation: Php 20M per proposal
Target Number of Project/s to be Funded: 2

This call focuses on advancing innovative communication systems that redefine connectivity through enhanced resilience, scalability, and adaptability. It targets emerging technologies such as 5G and 6G networks, swarm communications, software-defined radio, and cognitive networking to address critical challenges including spectrum scarcity, disaster response and recovery, and digital inclusion. The objective is to develop future-ready communication solutions that support smart cities, underserved and rural communities, and critical infrastructure, ensuring secure, reliable, and efficient connectivity in an increasingly complex and dynamic digital landscape.

Specific Requirements

To ensure that the research output will be utilized by the target industry or local regulatory agency, a letter of support / commitment / collaboration must be secured. The proponent should be able to secure training data sets from the target partner institution.

Industry 4.0

Call Rationale

The Fourth Industrial Revolution, or Industry 4.0, is transforming industries through the integration of advanced technologies such as the Internet of Things (IoT), artificial intelligence (AI), and cyber-physical systems. For the Philippines, embracing Industry 4.0 presents an opportunity to boost competitiveness, foster innovation, and ensure sustainable industrial growth.

The Council has supported the establishment of advanced mechatronics, robotics, and automation laboratory or AMERIAL in 2018. However, such facility must be maintained, sustained, and even expanded to accommodate beyond the training program that it can offer.

Bulk of the efforts so far were focused on capability building. The Council has been part of the industry 4.0 Technical Working Group (TWG) as organized by the Semiconductor and Electronics Industries in the Philippines Foundation Inc. (SEIPI) where series of industry-led webinars were already held for Industry 4.0 awareness and adoption. Also, through the established TWG, local standards were developed to assess the smart industry readiness and smart manufacturing maturity of industrial companies with initial focus on electronics industry.

As for the R&D technologies, the Council has already supported a project on the development of non-intrusive sensor-based prescriptive maintenance platform particularly for wire manufacturing on anomaly detection for wire extruders. DOST likewise supported new R&D projects on Digital Manufacturing Assembly Trainer (DMAT) and the Digital Twin Simulator (DTS), a modeling and simulation of a digital predictive twin and CUATRO (IR 4.o) Program of DOST-MIRDC. It is the vision of this sector to create and foster a flourishing innovation ecosystem for Industry 4.0 in the country.

Finally, for S&T policy, in collaboration with DTI and SEIPI, initiatives were already made in providing incentive systems for Industry 4.0 readiness assessment and certification. Curriculum changes and formulation of cybersecurity protocols will be explored in the coming years to increase responsiveness with the rapid pace of innovation in smart manufacturing.

However, challenges such as limited adoption of predictive maintenance systems, a lack of tailored digital transformation models for key industries, and the need for smarter production systems must be addressed. Developing solutions in these areas will enhance operational efficiency, reduce downtime, and enable data-driven decision-making.

This call focuses on developing degradation and predictive maintenance systems, digital transformation models for the electronics industry, cyber-physical production systems, and collaborative diagnostics and decision-making tools, aligning with the country's goals for industrial modernization and global competitiveness.

Call Objectives

- Advance applied R&D in industrial automation and analytics that address real-world industry needs and challenges;
- Develop intelligent, data-driven solutions that improve operational efficiency, quality control, predictive maintenance, and decision-making;
- Strengthen the integration of AI, IoT, robotics, and analytics in industrial environments;
- Support technology adoption and innovation among Philippine industries, particularly SMEs;
- Contribute to national priorities on digital transformation, innovation, and inclusive industrial growth;
- Support industry competitiveness by equipping local companies with the tools to transition toward Industry 4.0 standards.

Call Scope

This call intends to solicit proposals on the integration of intelligent sensor networks, coupled with AI, to improve existing systems and/or develop new services and breakthroughs in science as

applied to Intelligent Factories. To adopt the elements of the Industry 4.0 architecture, the Council will prioritize projects in the following fields:

1. Next-Generation Industrial Automation and Analytics
Maximum Budget Allocation: Php 15M per proposal
Target Number of Project/s to be Funded: 2

This call prioritizes innovative solutions that integrate automation, data analytics, Internet of Things (IoT), and artificial intelligence (AI) into physical production systems to enable smart, adaptive, and efficient manufacturing environments. Proposed projects should address key challenges faced by local industries, including productivity improvement, resource optimization, and sustainability, while promoting the adoption of Industry 4.0 technologies, particularly among small and medium enterprises (SMEs). Key focus areas include, but are not limited to, the following:

- Real-Time Monitoring and Control: Development of systems that deliver predictive insights and enable dynamic, data-driven adjustments in production processes.
- Intelligent Production Networks: Integration of smart machines, sensors, and IoT platforms to support seamless data exchange, interoperability, and automated decision-making.
- Sustainable Manufacturing Systems: Design and deployment of cyber-physical production systems (CPPS) that optimize energy consumption, minimize waste, and support environmentally responsible manufacturing practices.

Specific Requirement

Proposed projects must demonstrate the potential for wide-scale adoption, significant economic impact, and alignment with national priorities for industrial innovation and competitiveness. Proposals should include a letter of support from the target beneficiaries or intended adopters to ensure sustainability and relevance. Additionally, a Technology Roadmap outlining the development, deployment, and scaling of the proposed solution must be provided.

Creative Industry Sector (Game, Animation, and Film Cluster)

Call Rationale

Creative Industry is considered as one of the growing sectors in the global economy which contributes significantly to Gross Domestic Product (GDP) of developed countries. The Philippines is among the developing countries with rich cultural heritage and pool of creative talents that can potentially boost the economy through its creative goods. The country has the potential to be a creative hub in Asia through developing different creative industries including game, animation, and film.

The overall assessment of the existing roadmap highlights significant progress in facilities, human resources, R&D technologies, and S&T policies. Accomplishments include the establishment of extended reality (XR) facilities, and training 17 students and 240 personnel in game design and development. Additionally, the council supported the development of the Philippine Skills Framework for Game Development and Digital Art and Animation.

In terms of R&D, the focus has been on creating serious games for education, developing game engines, proprietary software for CAD and 3D visualization, and hardware such as the *SandPix* sand printer. Other ongoing projects include immersive XR crime scene simulations, cultural heritage preservation through digitization, and use of 3D modeling in biodiversity information.

Moving forward, relevant activities will be conducted with key stakeholders such as the Game Developers Association of the Philippines, Esports World Federation, and other relevant organizations, alongside hosting a Creative Industry Summit to strengthen the sector's development.

Call Objective

The main objective of this call is to accelerate the development of culturally grounded and workplace-oriented metaverse platforms through applied research and development. The initiative aims to:

- Enable immersive digital platforms that support cultural preservation, creative expression, and community engagement.
- Enhance workplace collaboration, training, and productivity through human-centered and inclusive virtual environments.
- Strengthen local R&D capabilities in metaverse technologies and position the Philippines as a regional leader in culturally relevant and future-ready digital workplaces.

Call Scope

This call targets to support applied research projects on one of more of the following priority areas:

1. Developing Metaverse Platforms for Culture and Workplace Applications
Maximum Budget Allocation: Php 15M per proposal
Target Number of Project/s to be Funded: 2 (PCIEERD-GIA)

The Metaverse is emerging as a transformative digital ecosystem that integrates extended reality (XR), artificial intelligence (AI), blockchain, and immersive collaboration tools to redefine how people interact, work, and preserve culture. Globally, metaverse platforms are increasingly adopted for virtual workplaces, cultural engagement, education, and creative collaboration, contributing to productivity growth and digital economic expansion. Key focus areas include, but are not limited to, the following:

- Immersive cultural spaces for museums, heritage sites, festivals, and indigenous knowledge systems
- Virtual workplace environments that support collaboration, onboarding, skills development, and organizational simulations, particularly for distributed and hybrid work settings, which may include blockchain-based identity verification, role management, and credential recognition

Specific Requirements:

Proposals must demonstrate the following:

- Innovation: A clear contribution to advancing creative technologies or processes.

- Applicability: Alignment with the needs of the Philippine creative industries, including scalability for adoption by local stakeholders.
- Sustainability: Adoption of environmentally conscious practices and long-term viability.
- To ensure that the research output will be utilized by the target industry or local regulatory agency, a letter of support / commitment / collaboration must be secured.

Quantum Technology

Call Rationale

Quantum technologies represent a new paradigm with transformative applications for digital economies and society (OECD 2025). As a cutting-edge field reshaping multiple sectors, quantum technology is attracting billions in global investment from leading economies such as the US, China, the European Union, and Australia. To remain competitive, it is crucial for the Philippines to develop capabilities in quantum technologies and build national technology capacity.

The Harmonized National R&D Agenda (HNRDA) 2022–2028 identifies quantum technology as a priority under emerging technologies. The DOST emphasizes that advancing R&D in innovative sectors is vital for sustainable growth and global competitiveness. The DOST identifies flagship R&D programs, including quantum computing, which are designed to address strategic national priorities while fostering innovation and technological advancement.

Call Objective

This call aims to fund R&D projects that generate new scientific knowledge to advance the global development of quantum technologies while simultaneously building a critical mass of local expertise. Funded initiatives must contribute to national innovation and the public good. The outputs produced by these projects are intended to support applications that will be developed in the future, such as, but not limited to, secure communication, precise measurement, and quantum computation. These future applications are expected to provide significant benefits by strengthening the country's long-term capabilities in sectors including energy, health, defense, and information technology, as well as other areas that may benefit from advances in quantum technologies.

Call Scope

The call is looking for proposals that will work on the following key research areas:

1. Quantum Computing

Research on quantum algorithms, quantum error correction and mitigation, quantum complexity theory, and emerging quantum hardware models including photonic, superconducting, spin based, NV centers in diamond, and memristive platforms. Includes the development of quantum programming languages, compiler infrastructures, simulation back-ends, and hybrid classical quantum workflows for materials modeling, chemical design, optimization, and other computational tasks. It also encompasses quantum machine learning, covering variational circuits, quantum neural networks, hybrid architectures, and performance benchmarking on existing devices and simulators.

2. Quantum Information Science (Foundations, Theory & Testbeds)

Fundamental studies of quantum states, entanglement, coherence, decoherence, resource theories, entropy, and quantum channels. Includes investigations of open and unstable quantum systems, quantum thermodynamics, quantum speed limits, and information-theoretic aspects of physical processes. Also covers foundational quantum testbeds—small-scale photonic or tabletop systems demonstrating Bell inequalities, Hong–Ou–Mandel interference, antibunching, and entanglement generation—together with integrated photonics, single-photon sources, and university-level capability building in experimental quantum information.

3. Quantum Secure Communication & Cryptography

Research on quantum key distribution (QKD), entanglement-based communication protocols, teleportation-assisted key exchange, and quantum-secure authentication and signature schemes. Includes post-quantum cryptography, hybrid classical–quantum security architectures, and experimental communication testbeds. Also encompasses real-time QKD over fiber or microsatellite links, noise analysis of simulated and hardware-based quantum measurements, and the development of rigorous security proofs and performance standards for deployable quantum communication systems.

4. Quantum Sensing & Metrology

Design and implementation of quantum-enhanced sensors using coherence, entanglement, squeezed states, quantum noise suppression, and solid-state defects such as NV centers in diamond. Target applications include geophysical monitoring, biomedical diagnostics, navigation, environmental sensing, materials characterization, and precision timing. Research spans theoretical modeling, device fabrication, system-level integration, and performance benchmarking to realize next-generation quantum-enabled measurement technologies.

5. Quantum Simulation

Theoretical and experimental simulation of quantum materials, molecular processes, chemical reactions, strongly correlated phases, and energy systems using controllable quantum platforms or quantum algorithms. Includes Hamiltonian engineering, analog quantum simulation in photonic or tabletop systems, variational simulation methods, and studies of quantum many-body dynamics such as correlated phases, transport, thermalization, and emergent collective behavior. Emphasis is placed on simulation fidelity, scalability, and domain-specific validation across scientific and technological applications.

6. Quantum Engineering & Enabling Technologies

Research and development of the classical and engineering subsystems that make quantum devices operable, stable, and scalable. This includes low-noise control electronics (e.g., FPGAs, ASICS, RF/microwave sources), cryogenic refrigeration technologies, high-vacuum and high-pressure environments, precision timing and synchronization systems, photonics interfaces, and advanced packaging/integration of quantum chips. These engineering foundations are essential for building prototypes, characterizing qubit platforms, and enabling reliable quantum experiments and testbeds.

Specific Requirements: DOST / DOST-PCIEERD will fund 5-7 projects with a budget of 5-25 million per project depending on the scope of work being proposed. A clear technology pathway/roadmap must be submitted.

References:

OECD, 2025) *A Quantum Technologies Policy Primer*, OECD Digital Economy Papers, No. 371, OECD Publishing, Paris, https://doi.org/10.1787/fd1153c3-en

Department of Science and Technology -Office of the Undersecretary for R&D: High Impact R&D Programs

Draft White Paper: Output of the Quantum Science and Technology Roadmapping Pre-Conference workshop.

Geospatial Technologies

Call Rationale

Next-generation geomatics and geospatial technologies refer to the convergence of advanced sensing, high-precision positioning and timing, Earth observation, in-situ monitoring, real-time data fusion, intelligent analytics, and enabling digital infrastructure that transform geospatial systems from static mapping into accurate, resilient, and decision-ready spatial intelligence for smart cities, environmental monitoring, disaster resilience, and digital public services.

These technologies are now rapidly becoming indispensable to national development, enabling evidence-based planning, resilient infrastructure, efficient public services, and informed decision-making across government and industry. As the Philippines advances toward smart cities, digital governance, and data-driven development, the demand for accurate, timely, and interoperable geospatial information continues to grow—particularly for disaster risk reduction and management (DRRM), environmental monitoring, land and coastal management, transportation, and urban systems.

A critical but underdeveloped foundation of this transition is Positioning, Navigation, and Timing (PNT). PNT capabilities underpin surveying and mapping, geodetic monitoring, Earth observation (EO) ground operations, telecommunications, logistics, and emerging autonomous and intelligent systems. However, PNT-focused research and development remains limited in the Philippines, and many operational requirements depend heavily on foreign GNSS constellations and commercially available solutions. While these services are essential, this dependence may introduce vulnerabilities related to availability, continuity, resilience, and long-term strategic autonomy—especially as geospatial systems become more integrated into critical public services.

Strengthening local capacity in PNT-related research—particularly in ground-based augmentation concepts, timing and synchronization methods, and system interoperability—offers a practical pathway to improve positioning accuracy, enhance temporal consistency, and increase the

reliability of geospatial workflows. When integrated with EO data and Internet of Things (IoT) sensor networks, enhanced PNT and synchronization capabilities can enable real-time, time-aligned environmental intelligence: improved sensor fusion, more reliable early warning systems, better situational awareness for LGUs, and stronger analytics for climate adaptation, resource management, and urban operations.

This Call aims to accelerate national R&D toward locally adaptable, pilot-scale, and scientifically validated next-generation geomatics solutions. It will support method development, prototype integration, and research-scale validation in areas such as timing and synchronization, GNSS augmentation concepts, EO–IoT data fusion, and geospatial intelligence workflows—anchored on rigorous error characterization, interoperability, and practical use cases. The initiative complements the Philippine Space Agency's (PhilSA) space-based efforts and aligns with DOST-PCIEERD priorities in emerging technologies, geoinformatics, and digital transformation, while expanding the country's scientific and technical capability to build resilient, scalable, and future-ready geospatial systems.

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Call Objectives

This Call aims to strengthen the country's geomatics capability by developing innovative, locally adaptable systems in positioning enhancement, spatiotemporal data integration, and precision timing to improve geospatial accuracy, environmental intelligence, and operational decision-making. Specifically, it seeks to:

1. Develop and pilot ground-based PNT reference and positioning enhancement systems that improve geolocation accuracy, data reliability, and calibration of EO and geospatial datasets, laying the groundwork for a scalable Philippine positioning enhancement framework.
2. Design, adapt, and demonstrate practical timing and synchronization solutions—including the evaluation and integration of compact precision timing devices and GNSS-based timing methods—to enhance temporal accuracy, interoperability, and resilience of geospatial, EO, and sensor network applications.
3. Integrate IoT environmental sensor networks with EO data through robust spatiotemporal fusion methods that use realistic synchronization and alignment approaches to generate timely, localized geospatial information for smart cities, disaster risk reduction, environmental monitoring, and infrastructure management.
4. Enhance local R&D competence and inter-agency collaboration in advanced geomatics, timing, and data fusion technologies, contributing to national goals in digital transformation, sustainable development, and evidence-based, data-driven governance.

Call Scope

Proposals to be submitted should be aligned with the *Next-gen Geomatics: Innovative Solutions* Roadmap and must fall within the following priority topics:

1. Development of Ground-Based PNT Reference and Augmentation Systems (1 project / Php 10-15 M)

This topic aims to support exploratory and pilot-scale research on localized approaches for enhancing GNSS-based positioning accuracy and reliability for geospatial applications such as surveying, mapping, Earth observation, and environmental monitoring. Proposals should focus on research-driven system design, algorithm development, and prototype integration rather than nationwide operational deployment.

Proposals may include the development and testing of localized GNSS augmentation concepts, algorithmic refinement of positioning corrections, and research-scale integration of prototype PNT reference nodes with selected existing geodetic or EO ground infrastructure. The objective is to generate validated methods, prototype components, and technical evidence that can inform future positioning enhancement initiatives and support the evolving needs of agencies such as PHIVOLCS, PAGASA, NAMRIA, and other institutions that rely on precise EO and geodetic data.

Scope may include:

- Design, development, and testing of localized GNSS augmentation approaches, such as differential correction modules or Precise Point Positioning / Differential Global Navigation Satellite System (PPP/DGNSS) enhancement algorithms, using publicly available datasets and limited prototype observations.
- Algorithmic testing and performance evaluation of PPP and DGNSS refinement models using selected regional GNSS reference stations on a research-scale basis.
- Pilot-scale integration and interoperability assessment of prototype PNT reference or observation nodes with existing GNSS CORS stations or EO ground-based facilities for scientific validation and feasibility analysis.
- Exploratory assessment of correction data dissemination mechanisms (e.g., IoT-based links, radio, mesh networks, or cellular infrastructure) to support limited field pilots and experimental validation of GNSS augmentation methods.

2. Timing and Synchronization Technologies for Geospatial and Environmental Systems (1 project / Php 10 M)

This topic aims to support research on the evaluation, adaptation, and prototype-level integration of compact timing devices and synchronization methods to improve the temporal accuracy and consistency of geospatial and environmental systems. Rather than the development of new atomic clock hardware, proposals should focus on the local adaptation, testing, calibration, and research-scale integration of commercially available timing technologies.

Improved timing and synchronization capabilities are expected to enhance interoperability among distributed sensor networks, synchronization of EO ground-based systems, and temporal consistency in geodetic and environmental monitoring workflows.

Scope may include:

- Evaluation and adaptation of compact precision timing devices (e.g., chip-scale atomic clocks, GNSS-disciplined oscillators, rubidium oscillators) for geospatial, Earth observation, or IoT-based sensing applications.
- Experimental or simulation-based demonstration of selected time-transfer techniques (e.g., GNSS-based, RF-based, optical, or short-range fiber-based) between limited ground stations, research facilities, or distributed sensor nodes.
- Development and evaluation of synchronization strategies for EO calibration activities, geodetic data processing workflows, or multi-sensor environmental monitoring, with

emphasis on method development, timing error characterization, and research-scale validation.

3. Integration of IoT Sensor Networks with Earth Observation Data (2 projects/Php 5-10 M per project)

This topic supports research on the integration of ground-based IoT sensor networks with Earth observation (EO) data to generate more accurate, localized, and timely environmental intelligence for hazard monitoring, forecasting, and smart city applications. Projects under this topic will emphasize PNT-enabled data integration, where positioning and timing information are used as enabling elements for sensor alignment, data consistency, and multi-source fusion, rather than as the primary technology focus.

The focus is on developing data-fusion methods, spatiotemporal alignment frameworks, and prototype decision-support tools that allow LGUs and national agencies to derive actionable insights from combined satellite and in-situ observations. Projects may adopt practical and locally appropriate timing and positioning approaches—such as GNSS-based timestamps, network time protocols (NTP), or local time servers—to ensure temporal coherence across distributed sensor systems in research-scale environments.

Scope may include:

- Integration of IoT sensor networks (e.g., rainfall, water level, air quality, temperature) with EO datasets for environmental monitoring, risk assessment, and early warning applications, including the development of prototype decision-support or visualization platforms for LGUs, DRRM offices, and environmental agencies.
- Development and testing of data-fusion algorithms or spatiotemporal alignment methods that harmonize satellite imagery and ground-based sensor observations, with attention to positioning accuracy, timing consistency, and data interoperability rather than operational deployment.

Specific Requirements

- Proposals must demonstrate strong scientific and technological merit, align with the funding priorities listed above.
- Proposals are expected to target TRL 3–5. At a minimum, proposals should advance technologies to TRL 4 (technology validated in a laboratory or controlled test environment). Projects may optionally validate selected components at TRL 5 (validation in a relevant field environment), subject to project scope and site accessibility.
- Projects should clearly define the scale of implementation (e.g., simulation study, prototype development, pilot testbed) appropriate to a 2–3 year R&D timeline.
- Collaboration among academic institutions, government agencies, and industry partners is highly encouraged.
- Projects should present clear deliverables, realistic timelines, and potential pathways for commercialization or industry adoption.
- Proponents must include a technology commercialization pathway and sustainability plan, identifying potential end users and outlining mechanisms for scale-up or transitioning outputs to end users.

II. Energy and Utilities Systems Technology

Intelligent River and Water Management

Call Rationale

The Philippines faces increasing water management challenges due to climate change, rapid urbanization, and aging infrastructure. Extreme weather events such as typhoons, floods, and droughts disrupt river systems, sediment balance, and water availability. Smart and science-based approaches are essential to monitor river dynamics, manage sediment, and forecast water-related hazards. This program emphasizes integrated solutions for sustainable river and water management, leveraging technology for real-time monitoring, predictive analytics, and adaptive interventions.

From 2026 to 2028, the water situation in the Philippines is expected to become more critical, exacerbated by climate change, rapid population growth, and aging infrastructure. According to the World Resources Institute's Aqueduct Water Risk Atlas (2023), water stress is projected to worsen, particularly in urban areas like Metro Manila and Cebu, where rising water demand is compounded by limited supply. The Philippine Statistics Authority (2020 Census) shows a growing population, further increasing pressure on water resources. The National Water Resources Board (NWRB) reports that current water infrastructure—such as dams and irrigation systems—struggles to meet demand, particularly in Mindanao and Luzon, where water availability is increasingly erratic.

Climate change further exacerbates these challenges, with PAGASA forecasting disruptions in rainfall patterns due to El Niño and La Niña phenomena. Prolonged El Niño events lead to lower streamflow, reduced water supply for agriculture and hydropower, and dam drying. Conversely, La Niña events cause flooding, water quality deterioration, and contamination of water supplies. These fluctuations not only affect irrigation but also impede aquifer recharge, crucial for long-term water sustainability.

To address these mounting challenges, the Department of Environment and Natural Resources (DENR) has implemented the Integrated Water Resource Management (IWRM) framework, aiming to optimize water use while enhancing resilience to climate change. The National Irrigation Administration (NIA) advocates for the modernization of irrigation infrastructure to improve efficiency and water management in agriculture. Additionally, the Philippine Climate Change Commission, through its National Climate Change Action Plan (NCCAP) (2021), promotes integrating climate adaptation strategies into water management. These strategies include improving water storage, upgrading flood control, and investing in water conservation technologies.

The Philippine Water Supply and Sanitation Master Plan (2020), developed by the National Economic and Development Authority (NEDA), provides a comprehensive framework for improving water access and infrastructure. It sets ambitious goals, including achieving universal access to potable water and sanitation services by 2030, aligning with the Sustainable Development Goals (SDGs). The plan also emphasizes integrated water quality management and infrastructure development to ensure that water systems are resilient to climate impacts, population growth, and environmental degradation.

Despite these efforts, without significant investment and reform, the Philippines is at risk of facing a severe water crisis by 2026-2028. The crisis will impact domestic water supply, agriculture, and hydropower generation, and will exacerbate challenges related to water quality and aquifer recharge. Integrated management and a focus on long-term climate adaptation and infrastructure development are crucial to ensuring a sustainable water future for the country.

Call Objective

The objective of this call is to develop and implement intelligent, science-based solutions for river and water management. Projects should focus on flood monitoring, sediment management, river geomorphology, and water sustainability through advanced technologies and forecasting tools. Efforts must align with national frameworks such as the Integrated Water Resource Management (DENR), NCCAP (Climate Change Commission), and the Philippine Water Supply and Sanitation Master Plan (NEDA). References: World Resources Institute Aqueduct Water Risk Atlas, PSA 2020 Census, NWRB, PAGASA, DENR, Climate Change Commission, and NEDA.

The objective of this call is to provide scientific and technological (S&T) interventions that have not yet been applied locally, aimed at improving the effective management of water resources. This includes the development and deployment of innovative scientific tools, methodologies, and technologies to ensure a safe, reliable, and sustainable water supply

Call Scope
The R&D initiatives should address/cover the following identified research areas :

1. Smart River Systems (Monitoring and Management) - focused on flood monitoring, sediment management, and river geomorphology *(Maximum of One Project with a maximum total funding of Php 15,000,000.00)*

   This research area supports the development and deployment of advanced river monitoring and management technologies that deliver real-time data on hydrological variables such as streamflow, water levels, and sediment transport. Current initiatives such as the Integrated Water Resources Management Information System (IWRMIS) being implemented by the NWRB, which uses multi-sensor networks across river basins to support decision-making, demonstrate how technology can transform water governance and resource allocation. Project under this scope should build on and augment these efforts by introducing localized, low-cost sensor networks, drone-based geomorphological mapping, and automated river profiling tools that enable dynamic flood and sediment erosion assessment. Proposal must clearly show how their technologies improve on existing systems in terms of timeliness, accuracy, and operational efficiency, and how outputs can be integrated into basin-level planning frameworks and policies used by NWRB, DENR, and local government units (LGUs).

   Building on the DENR's Integrated Water Resources Management (IWRM) mandate to establish centralized monitoring and data systems, applicants should propose interoperable platforms that support multi-agency data sharing and visualization. Emphasis should also be placed on river geomorphology models that quantify sediment budgets and morphological change under extreme rainfall conditions, supporting both disaster risk reduction planning and sediment management interventions such as dredging prioritization and floodplain restoration.

2. S&T-Based Safe Water Systems (Assessment, Forecasting, and Intervention) – focused on water safety, availability, and climate-resilient management through science-based assessment, forecasting, and targeted interventions. *(Maximum of One Project with a maximum total funding of Php 15,000,000.00)*

   This scope focuses on developing science- and technology-based tools to ensure the safety, reliability, and climate resilience of water supply systems. The proposal should address risks to water sources arising from climate variability, flooding, drought, and pollution through integrated assessment and forecasting of water quantity and quality. The proposal should now include water and wastewater treatment, in addition to monitoring and predictive modeling, to ensure safe and sustainable water services. Priority should be given to advanced decision-support systems that enable early detection of water safety threats and guide operational management for water utilities, irrigation operators, and water resource managers.

   Aligned with the Philippine Water Supply and Sanitation Master Plan (NEDA), the National Climate Change Action Plan (NCCAP), and the Integrated Water Resources Management (IWRM) framework, this scope emphasizes intervention-oriented research with clear operational applications. Projects are expected to support the development of S&T-based Integrated Water Management Plans (IWMPs) with clearly defined short-, medium-, and long-term strategies, which shall serve as a technical basis for LGUs and key stakeholders in managing water resources, addressing water-related hazards and wastewater, and implementing targeted S&T intervention projects. Proposals must include cost-comparative analyses of technological and nature-based interventions and demonstrate collaboration with relevant government agencies, water utilities, and local government units to ensure scalability and/or regional up to national applicability.

Specific Features Sought in this Call:

DOST invites proposals for the development of intelligent, cost-effective, and localized tools, methodologies, and technologies to enhance river and water management. This includes smart systems for flood monitoring, sediment management, river geomorphology, and water sustainability, addressing hazards such as flooding and drought through advanced forecasting and intervention strategies.

The program aims to address critical challenges such as river system degradation, sediment imbalance, water scarcity, and climate-induced hazards. Proposals should integrate climate change adaptation strategies aligned with the National Climate Change Action Plan (NCCAP), support the Philippine Water Supply and Sanitation Master Plan (2020) by NEDA, and adhere to the Integrated Water Resource Management (IWRM) framework by DENR. Solutions must promote sustainable practices and resilience in river and water systems.

Proposals must include a cost-comparative assessment of interventions, demonstrating improvements in monitoring, forecasting, and operational efficiency. Projects should contribute to the development of intelligent water management tools, guidelines, and operational protocols for both existing and future infrastructure.

Proponents are required to collaborate with relevant stakeholders, including technology providers, water utilities, government agencies, and end-users. A commitment letter and counterpart funding for project implementation are mandatory.

Sources:

1. World Resources Institute (WRI) - Aqueduct Water Risk Atlas
   https://www.wri.org/aqueduct
2. Philippine Statistics Authority (PSA) - 2020 Census of Population and Housing
   https://psa.gov.ph/content/2020-census-population-and-housing
3. National Water Resources Board (NWRB)
   https://www.nwrb.gov.ph/
4. PAGASA - Philippine Atmospheric, Geophysical and Astronomical Services Administration
   https://www.pagasa.dost.gov.ph/
5. Department of Environment and Natural Resources (DENR) - Integrated Water Resource Management
   https://www.denr.gov.ph/
6. Philippine Climate Change Commission - National Climate Change Action Plan (NCCAP) 2011-2028
   https://www.climate.gov.ph/our-programs/national-climate-change-action-plan
7. National Economic and Development Authority (NEDA) - Philippine Water Supply and Sanitation Master Plan
   https://www.neda.gov.ph/

Resilient and Smart Construction Solutions for Infrastructure Modernization

Call Rationale

The Philippine construction sector is under increasing pressure from rapid urbanization, evolving safety and quality standards, and climate-related hazards such as typhoons, floods, earthquakes, and extreme heat. These stressors expose gaps in materials performance, construction methods, digital readiness, and disaster resilience. To meet national infrastructure goals, there is a strategic need to modernize the sector through science-and-technology (S&T) interventions that improve durability, safety, productivity, and sustainability, while ensuring clear pathways for adoption and policy integration.

In the Philippines, national programs for construction resilience and modernization are primarily driven by large-scale infrastructure agendas and climate adaptation frameworks. As of late 2025, these initiatives emphasize integrating disaster-proof designs, sustainable materials, and digital technology into national development. The Build Better More (BBM) Program, the government's primary infrastructure agenda for 2023–2028, covers 198 high-impact flagship projects with a total investment of ₱8.8 trillion. It aims to modernize transport systems, water resources, and digital connectivity while ensuring these infrastructures are resilient to climate-induced shocks. Complementing this is the Philippine Development Plan (PDP) 2023–2028, which sets the overarching strategy for construction modernization and promotes inclusive, high-growth pathways through deep economic and social transformation in the infrastructure sector.

Climate adaptation frameworks further reinforce this direction. The National Adaptation Plan (NAP) 2023–2050 provides a long-term strategy to reduce vulnerability and build adaptive capacity, guiding the integration of climate resilience into building standards and infrastructure planning. Tools such as the Building Resilience Index (BRI) have been introduced to evaluate and verify a building's capacity to withstand environmental shocks, while programs like the Risk Resiliency and Sustainability Program (RRSP), also known as the Strategic Program for Climate Resilience, focus on enhancing the resilience of infrastructure and natural systems.

These national priorities are supported by sector-specific initiatives, including the Department of Public Works and Highways (DPWH) digitalization roadmap, the Department of Trade and Industry (DTI) through the Construction Industry Authority of the Philippines (CIAP) Philippine Construction Industry Roadmap 2020–2030, and housing programs led by the Department of Human Settlements and Urban Development (DHSUD) and the National Housing Authority (NHA), such as the Pambansang Pabahay Para sa Pilipino Program (4PH). Hazard data platforms like the Philippine Institute of Volcanology and Seismology (PHIVOLCS) GeoRiskPH, and the continued development of the National Structural Code of the Philippines (NSCP), further strengthen evidence-based planning and resilience standards.

The Department of Science and Technology (DOST) complements these efforts by supporting research and development initiatives that strengthen innovation in infrastructure, promote collaboration among stakeholders, and enable technology transfer and commercialization. As part of this modernization agenda, there is an increasing need for secure digital traceability and verification systems that enhance transparency, compliance, and accountability across the construction value chain.

Together, these national programs and institutional efforts establish a strong foundation for this call for proposals. The goal is to accelerate innovation in resilient and smart construction solutions that align with national priorities, support climate adaptation, and enable digital transformation in the Philippine construction industry.

Call Objective

This call seeks science- and technology-based solutions that:

1. Enhance materials performance and sustainability for climate-resilient infrastructure.
2. Accelerate digitalization of construction workflows (e.g., BIM, digital twins, AI-driven monitoring) to reduce risk and increase productivity.
3. Strengthen engineering capacity through specialized facilities and tools supporting hazard-resilient design and analysis.
4. Advance localized, modular construction equipment and deployable systems for efficient, safe construction in diverse Philippine settings.
5. Improve building codes, standards, and guidelines through validated, science-based solutions, ensuring that new technologies and practices are backed by rigorous evidence and can be integrated into regulatory frameworks for nationwide adoption.

Call Scope

The R&D initiatives should address/cover the identified research areas:

1. Innovative Construction Materials (Two projects amounting to a total fund of ₱30,000,000.00)
   - This thematic area focuses on developing climate-adaptive, durable and sustainable construction materials suited for diverse Philippine environments and hazards, emphasizing the use of locally available resources and recycled materials **particularly** metals, rubbers, plastics and other non-agro-industrial waste streams. Solutions must undergo comprehensive performance benchmarking and durability testing, followed by controlled pilot-scale implementation in representative field conditions. These pilots should generate empirical data to validate structural resilience, cost-efficiency, and full compliance with Philippine building codes. Proposals should also present a clear roadmap for standards integration and adoption pathways to enable nationwide scalability and long-term impact.
2. Infrastructure Design, Analysis, and Standards Integration (One project amounting to a total fund of ₱40,000,000.00)
   - This thematic area emphasizes the development of advanced modeling and simulation tools for multi-hazard resilience, asset management, and lifecycle optimization. Proposals should aim to produce science-backed evidence packages that improve building codes, standards, and guidelines, ensuring integration into regulatory frameworks through collaboration with professional bodies and government agencies.
3. Integrated Digitalized Modular Construction Systems (Two projects amounting to a total fund of ₱55,000,000.00)

- This thematic area focuses on the convergence of digital transformation and modular construction technologies to create safer, more efficient, and adaptive construction workflows. Proposals should aim to:
- Develop interoperable digital platforms (e.g., BIM, digital twins, AI/ML-driven monitoring, automated QA/QC) that seamlessly integrate with modular construction equipment for real-time project management, predictive maintenance, and hazard-resilient operations.
- Design and localize scalable, modular equipment embedded with smart sensors and IoT capabilities to enable automated construction, inspection, and lifecycle monitoring.
- Develop secure digital systems that provide end-to-end traceability and verification of construction materials and activities, supporting due diligence, regulatory compliance, and coordinated data sharing to strengthen transparency and operational reliability across the construction sector.

All proposals must:

1. Align with relevant national priorities and frameworks (e.g., infrastructure modernization, climate adaptation, and industry digitalization policies).
2. Demonstrate clear innovation and differentiation from existing practices.
3. Include adoption pathways (standards integration, regulatory/policy engagement) and commercialization/technology transfer plans.
4. Secure commitment letters from intended end-users and partners and outline counterpart contributions.
5. Define measurable outcomes, validation protocols, and schedules that align with the readiness of partner agencies.

Sources:

- COA. (2023). Infrastructure Audit Guidelines.

- DOST. (2023). Science for Change Program (S4CP), CRADLE, NICER Initiatives.
- Build Better More (BBM) Program: The central 2023–2028 infrastructure plan focuses on 198 flagship projects for connectivity and climate resilience. (https://pdp.depdev.gov.ph/wp-content/uploads/2023/07/Chapter-12.pdf, https://cpbrd.congress.gov.ph/wp-content/uploads/2024/10/FF2024-13-Build-Better-More.pdf, https://www.bsp.gov.ph/Pages/IRG/irg-files/PPP%20in%20the%20Philippines%E2%80%99%20Infrastructure%20Flagship%20Projects%20%28June%202025%29.pdf
- National Adaptation Plan (NAP) 2023–2050: The strategic long-term roadmap for disaster-resilient building and climate adaptation.

- PHIVOLCS Modernization Act (RA 12180): Signed in April 2025, this law mandates a ₱7 billion modernization to enhance seismic monitoring and update structural safety standards. (https://lawphil.net/statutes/repacts/ra2025/ra_12180_2025.html, https://www.phivolcs.dost.gov.ph/ph-government-affirms-support-to-its-state-agency-on-volcano-earthquake-and-tsunami-monitoring/)
- Construction Industry Authority of the Philippines (CIAP): Oversees the modernization of the domestic construction industry and regulatory streamlining. (http://construction.gov.ph/, http://construction.gov.ph/wp-content/uploads/2022/07/18-PCIR-Action-Plans.pdf)
- Building Information Modeling (BIM) & Digital Transformation: Part of the 2020–2030 Roadmap to modernize construction workflows.(http://construction.gov.ph/news_announcements/construction-guidelines-for-project-implementation/)

- Communities for Resilience (CORE) Program: Technical training for engineers and local officials on integrating science into local construction.

- DPWH. (2023). *Build Better More Program Overview*.
- DTI-CIAP. (2020). *Philippine Construction Industry Roadmap 2020–2030*.
- DHSUD. (2023). *Pambansang Pabahay Para sa Pilipino Program (4PH)*.
- NHA. (2023). *Resettlement Assistance Program*.
- CCC. (2023). *National Adaptation Plan 2023–2050*.
- PHIVOLCS. (2023). *GeoRiskPH Platform*.
- PAGASA. (2023). Impact-Based Forecasting System.
- ASEP. (2023). National Structural Code of the Philippines.

Transportation

1. Logistics

Call Rationale

AmBisyon Natin 2040, identifies “connectivity” through roads, bridges, ports, vehicles, and transport systems as a “priority sector” as critical for the Philippines’ economic and social transformation and competitiveness. The recently published Philippine Development Plan (PDP) 2023-2028 acknowledges transport and logistics as key in linking markets to each other and in facilitating the movement of people and goods.

Towards this end, national government agencies, such as the Department of Trade and Industry (DTI), the Department of Transportation (DoTr), and the Department of Public Works and Highways (DPWH), have formed a collaboration to launch initiatives that aim to facilitate the seamless movement of goods. The Pagtanaw 2050 by the Department of Science and Technology has also foregrounded the role of transportation, especially considering the country's maritime and archipelagic environment. For its part, the Council has also formulated transportation roadmaps in support of these thrusts.

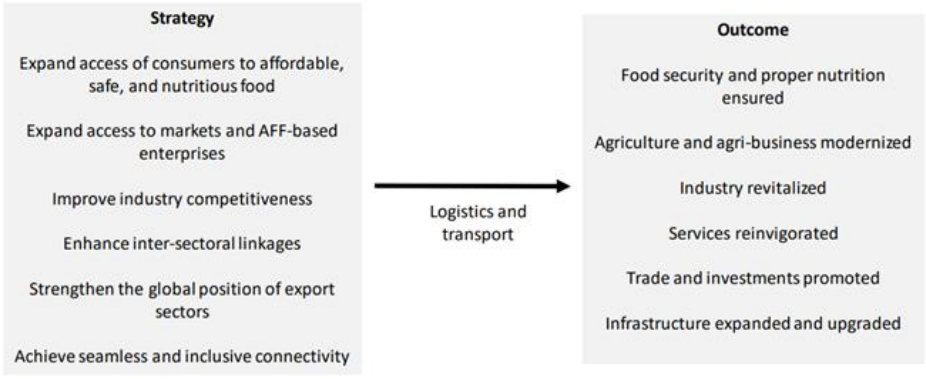


Figure 1: Logistics and transport as a key component of the strategy to achieve national outcomes (Adapted from PDP 2023-2028)

In a series of consultations conducted by the Council in 2022, the theme of "digital transformation of the transport sector" emerged as a prominent area suggested by the stakeholders (see, for example, Sunio et al, 2022). Digitalization has for many years been supported by the Council, as can be seen in its Transport S&T Roadmaps (2020-2024). Moving forward, we aim to further support the digital transformation of the transport sector in the following areas: (a) human element and training, (b) cargo and logistics, (c) maritime safety, and (d) vessel management. The need for digitalization was in no small part catalyzed by the COVID pandemic, which fueled rapid digitalization across the globe.

Call Objective

The objective of this call is to provide science and technology intervention to accelerate the digital transformation of the transport and logistics sector. Digital transformation may result in greater efficiency in the delivery of services and in increased industry competitiveness. We are interested specifically in the digital transformation of the following:

- Logistics sector through the adoption of the physical internet paradigm

Call Scope

The R&D initiatives should address/cover the identified research areas:

1. The Digital Transformation of the Logistics Sector

A. Development of proof-of-concept in support of the implementation of the physical internet for urban and maritime logistics *(Maximum of 2 projects with a maximum total funding of PHP 10,750,000)*

Since the physical internet is a new paradigm in the Philippines, there is a need first to persuade potential stakeholders from the logistics sector of the viability of implementing the physical internet in the Philippines. In this regard, proofs of concept (POC) are needed. They can be simulation- or field-based proofs of concept, which aim to gradually implement and test key functions of PI-enabled interconnected logistics. The POCs must demonstrate how the industry may look like in comparison to the status quo and the potential gains that may be expected when partially and fully transitioning to the Physical Internet.

Mentioned in the national logistics master plan of the Department of Trade and Industry (DTI) as a key action area where DOST can contribute to, this project aims to utilize information and communication technologies to facilitate the seamless movement of cargo from ports to urban areas. Such emerging ICT may enable the integration of ports and cities for efficient freight movement and logistics.

2. Maritime Transport

Call Rationale*:*

The Philippines, as an archipelagic nation with over 36,000 kilometers of coastline and a heavy reliance on maritime transport, faces growing challenges related to port emissions, fuel dependency, and the modernization of its maritime fleet. Tugboats—critical assets for harbor operations, ship assist, and port safety—operate intensively within confined port areas and are among the highest fuel-consuming and emissions-intensive vessels per operating hour. These characteristics make tugboats ideal candidates for electrification.

However, the Philippine maritime industry faces persistent challenges, including high greenhouse gas emissions, aging vessel fleets, limited adoption of clean technologies, safety and efficiency gaps, climate vulnerability, and fragmented research and innovation capacity. These challenges are further intensified by global commitments to decarbonization, such as the International Maritime Organization's (IMO) emissions reduction targets, and by increasing climate risks affecting ports, coastal infrastructure, and shipping routes.

At present, maritime research and development efforts in the Philippines remain dispersed across institutions, with limited coordination between government, academia, industry, and local communities. This fragmentation constrains the country's ability to generate evidence-based policies, develop indigenous maritime technologies, and build a skilled workforce aligned with sustainable and resilient maritime transport systems.

MARINA's Maritime Industry Development Plan (MIDP) 2019–2028 prioritizes the promotion of an environmentally sustainable maritime industry, which includes reducing pollution from vessels and implementing marine environment protection strategies. Electric tugboats contribute directly to these goals by cutting greenhouse gases (GHGs), air pollutants, and noise in port operations.

Electric Tugboat R&D is timely and strategic for the Philippines. It addresses environmental sustainability, energy security, and port modernization while fostering local innovation and industry capability. By investing in e-tugboat research and pilot deployments, the country can accelerate

the transition toward cleaner, more efficient, and resilient maritime transport systems—starting from its ports, where the impact is immediate and measurable.

The establishment of a Sustainable Transportation and Energy Systems Research Laboratory responds directly to these gaps. The Center will serve as a national hub for interdisciplinary research, technology development, policy support, and capacity building focused on low-carbon, safe, inclusive, and climate-resilient maritime transport. It will support innovation in areas such as green ship design, alternative fuels, port sustainability, digitalization, maritime safety, and adaptation to climate change.

The global transition toward sustainable, low-carbon transportation and energy systems is accelerating, driven by climate change imperatives, energy security concerns, rapid urbanization, and advances in electrification, digitalization, and artificial intelligence. In the Philippines, this transition presents both opportunities and challenges: the need to deploy reliable electric mobility, renewable-energy-based microgrids, and smart energy systems while ensuring safety, performance, affordability, and local technical capacity.
Sustainable transportation systems, such as electric vehicles (EVs), electric marine propulsion, rail electrification, and intelligent transport systems, are increasingly coupled with advanced energy systems, including renewable generation, energy storage, power electronics, and microgrids. These integrated systems require rigorous testing, verification, and validation before deployment. However, there is a significant gap in local facilities that can systematically test hardware, software, and system-level performance under realistic operating conditions.

The proposed Sustainable Transportation and Energy Systems Research Laboratory (STESRL) aims to address this gap by establishing a dedicated facility for research, testing, demonstration, and capacity building in sustainable transportation and energy systems. The laboratory will serve as a platform for research and development (R&D), industry collaboration, policy support, and human resource development.

Call Objective

To develop, demonstrate, and enable the adoption of electric and hybrid-electric tugboat technologies that reduce emissions, improve energy efficiency, and enhance the sustainability and competitiveness of Philippine port operations.

- Design and Development of a Hybrid-Electric Tugboat for Low-Emission Philippines Port Operators
- Sustainable Transportation and Energy System Research Laboratory (STESRL)

Call Scope

The R&D initiatives should address/cover the identified research areas:

Covers research, development, demonstration, and pre-commercialization activities that support the design, validation, and deployment of electric and hybrid-electric tugboat technologies suitable for Philippine port operations. Projects under this call may address one or more of the areas implementations *(Maximum of 1 project with a maximum total funding of PHP 60,000,000)*

This call supports the establishment and initial operation of a Sustainable Transportation and Energy Systems Research Laboratory (STESRL) that will function as a national hub for research,

innovation, policy support, and capacity building in sustainable maritime transport. Project under this call may address one or more areas implementation (Maximum of 3 projects under 1 program with maximum total funding of PHP 200,000.00).

Sources:

The following materials are suggested for further reading. These are write-ups prepared after the stakeholders' consultations:

Sunio, V., Santos, E., Baleta, F. and Tabañag, I (2022). "Research and Development Agenda for the Philippine Maritime Sector: Results from Stakeholder Consultations". https://ncts.upd.edu.ph/tssp/wp-content/uploads/2023/01/TSSP2022_02.pdf

Special Issue on the Digital Transformation of Transportation.

https://innovatus-pub.github.io/abstractpublications_archive/abstractpublications_2022b.html

Maritime Industry Development Plan (MIDP) 2019-2028 - MARITIME INDUSTRY AUTHORITY

III. Industrial Technology

Food Sector

Call Rationale

The Philippine food and beverage (F&B) manufacturing industry continues to serve as a cornerstone of the economy, retaining its position as the country's largest manufacturing sector. In 2024, F&B accounted for over Php 2.41 trillion or 53% of total manufacturing gross value added (GVA), growing 5.6% for the year (PSA, 2024). In terms of exports, agri-food products are valued at Php 420.5M which constitute 9.75% of the country's total exports in 2024 (PSA and DTI-EMB, 2025). The growing trend in the sector persisted into early 2025, with the Monthly Integrated Survey of Selected Industries (MISSI) reporting a 9.3% increase in the value of production for food products in January 2025, making it the top contributor in driving the overall momentum of local manufacturing industries (PSA, 2025).

Despite its continued growth, the sector faces persistent vulnerabilities. Global supply chain disruptions, climate-related risks, and shifts in market requirements and consumer demand patterns continue to influence raw material availability and processing efficiency. The need for resilience is also further elevated by ongoing challenges in food security, with 3 in every 10 households (31.4%) still experiencing moderate to severe food insecurity (FNRI, 2024), while 44.0% of the population or 51 million people remain unable to afford a healthy diet (FAO, 2025). This underscores the importance of integrating innovation for sustainability and local resource utilization in food system transformation efforts as embodied in national policies including the National Food Policy Manual, National Agriculture and Fisheries Modernization and Industrial Plan 2021-2030, and the Philippine Foresight on Science, Technology, and Innovation.

With its commitment in enhancing industry sector productivity, PCIEERD continuously fosters the development and implementation of programs for improved market competitiveness, safety, and sustainability of the food and beverage manufacturing industry through innovative technologies

and interventions. The Food Sector is one of the Council's largest priority sectors. With considerable support through both DOST and PCIEERD grants-in-aid (GIA) programs, the sector received a total of Php 2.2 billion for 167 projects from 2011-2024, coming in second to Space Technology Applications together with the agro-industrial and chemical process sectors.

This support is as specified in the Harmonized National R&D Agenda 2022-2028 for Industry, Energy, and Emerging Technologies, and in support of the UN Sustainable Development Goals No. 2 on Zero Hunger and No. 12 on Responsible Production and Consumption. This is aligned with efforts towards the following food security and nutrition outcomes identified in Chapter 3 of the Philippine Development Plan 2023-2028 and the Philippine Food Systems Transformation Pathway:

- Improved access to safe and nutritious food
- Shift to healthy and sustainable consumption patterns
- Boosted nature-positive production at scale
- Advanced equitable livelihood and value distribution
- Built resilience to vulnerabilities, shocks, and stresses

Call Objectives

This Call aims to continue supporting effective programs and strategies for (1) ensuring product safety and quality, (2) utilizing local products to reduce imports of raw materials for food processing, (3) developing technologies for the conversion of "waste-materials" into value-added products, (4) development of capabilities for the food sector, (5) optimizing digital platforms for the food value chain, and (5) conduct of joint research on new processing technologies and systems in response to global trends for a more sustainable and resilient agri-food sector.

Call Scope

This Call covers the following programs of the Food Sector with specific priorities presented in the next sections and as validated with stakeholders:

1. Food Innovation Program
2. DOST Integrated Food Safety Program
3. DOST Halal S&T Program

Specific Features Sought for all Food Sector Programs:

1. The implementing agency and proponent should have a track record and established expertise on the proposed project.
2. For project leaders with on-going projects, updated reports for their respective projects should be submitted (i.e. technical progress and terminal and audited financial report). For completed projects, clearance from the funding agency from any obligations under the project.
3. A collaborative undertaking among institutions is encouraged. Institutions from other region/s working on similar or related research areas may also be engaged given their capability and commitment.
4. The proposal must include the following details:
    a. Detailed Review of Literature by including previous works and/or relevant studies where the proposal will take off.
    b. Sound scientific basis including:
        - Relevant data and literature to provide situationer for the pressing national problems to be addressed

- Appropriate experimental design and statistical analyses
- Advantages and differentiation over existing similar technologies/studies

c. Information on potential socio-economic impact and marketability:
   - Projected employment generation after completion of the project. Identify the possible specific jobs to be involved and estimated number of personnel needed.
   - Estimated increase in income/productivity
   - Current demand and potential market expansion

d. Advantages of the proposed intervention and its target cost over the existing/commercially available/similar interventions
e. Potential impacts to the identified industry partner or partner institution.
f. Data on how the project can contribute to the improvement of environmental conditions by including any possible environmental impact from the proposal and waste management plan
g. Adequate counterpart funding from the implementing and partner agencies
h. Counterpart resources (e.g. facilities, equipment) available in implementing and partner agencies
i. Letter of commitment from identified cooperating agencies willing to test and/or adopt the project output.
j. Risk Management Plan
k. Technology Roadmap

4. Clear plans for utilization of project results:
   a. Specify mechanisms for the sustainability of operations
   b. Strategies for wider adoption by indicating how the project results can be scaled up to be widely used or available
   c. Details on how the target beneficiaries will participate or benefit from the project
   d. Plans for promotion and transfer of technology to end-users
5. Sustainability plan including established mechanisms in terms of institutional, financial, and human resources capability after project completion

I. Food Innovation Program

The Food Innovation Program was conceptualized with the vision to make local industries more sustainable and geared towards innovative food products with better quality and improved safety that responds to the population's nutritional and health requirements. The program aims to help address the following challenges identified relative to the ASEAN integration in 2015 continue to affect the local industries: 1) Continued dependence on imported raw materials; 2) Need for improvement or innovation in local technology; 3) Ability to consistently deliver the required level of quality and food safety. To address these concerns, an array of possibilities exists for innovation - from the sourcing of raw materials, processing, packaging, including marketing and distribution systems.

Since 2021, there have been 39 projects implemented under the Food Innovation Program with 216.9M funding support. Processing technologies available at the Food Innovation Centers such as thermal processing, spray drying, and cabinet drying are the majority of technologies used in these projects. These led to both scientific and market-driven output by generating 70 products, 38 licensing agreements with industry partners, 16 IPs, 42 publications, 646 researchers trained, and 12 policies. For 2025, 4 projects were approved under the Food Innovation program.

The priorities under the Food Innovation Program were revisited with 63 representatives from the industry, academe, and government through a consultation held back-to-back with a forum in

November 2025 with the theme: *Facilitating Food Futures: Science and Innovation Solutions for the Philippine Food Industry 2050*.

Priorities

1. *Enabling Technologies for Food Innovation* - these include projects on establishment or upgrading of processing centers and other facilities, building capabilities, and enhancing systems that impact the food sector as a whole:
   - New Processing and Packaging Technologies for Local Food Industries
     - Nutrition-sensitive food processing technologies
       - Freeze Concentration Technology (for coconut water, calamansi, mangosteen, and other juices)
       - Isochoric Freezing
       - Irradiation Technology
       - High Pressure Processing

   - Processing Technologies for Sustainable Food Products (i.e. Plant Based Food, Alternative Proteins for meat, egg, and dairy, enzymes for food)
     - Extrusion Technologies (Dry, High Moisture, Thermal)
     - Fermentation Technologies (Biomass and Precision Fermentation)
     - Microwave assisted thermal processing technologies
     - Cell-based food processing
     - 3D printing for food applications
   - Smart Food Packaging Solutions
     - Sustainable food packaging from algae and seaweed sources
     - Self-heating and cooling mechanisms for food packaging
     - Predictive analytics in food packaging

2. *Innovative Food Products* - these include projects on new product development for ingredients or intermediate food, emergency food, and other novel food products:
   - Valorization of Food Processing Industry By-Products and Seasonal Production Surplus for Food Applications as Food Ingredients/Additives
     - Food fibers (Bamboo, Ginger, Corn, etc.)
     - Modified starches (Coconut, Corn, Yam, Tapioca)
   - Sustainable and Healthier Alternative Food Products Using Local Sources
     - Alternative meat, egg, and dairy products (coconut, legumes, seed sources, etc.)
     - Alternative Salt products (yeast, seaweed, low-sodium alternatives)
     - Alternative Food Colors (plant, microbial-based sources)
     - Alternative fats and oils (legumes, seed sources, etc.)

3. *Specific Industry or Regional Concerns* - these include projects conceptualized to address a particular problem or challenge of a company or an industry group with the intent to adopt and commercialize the technology. Proposals under the Collaborative Research and Development to Leverage Philippine Economy (CRADLE) fall under this theme:
   - Localization of air classification processing technology
   - Development of local glucomannan and derivative food products
   - R&D on emerging areas in sensory science and rheology
   - Integrated technologies for citrus processing
   - Integrated technologies for seaweed processing
   - New Food Innovation Centers Program

Target Number of Projects: 5
Total Budget: 50M

II. DOST Integrated Food Safety Program

The Republic Act 10611, or the Food Safety Act of 2013, establishes the national framework for ensuring food safety and quality across the entire farm-to-fork chain. It underscores that safeguarding the local food supply is a shared responsibility—from production and postharvest handling to processing, distribution, and consumption. To support this mandate, robust R&D and S&T initiatives remain essential.

The Department of Science and Technology (DOST) advances the implementation of the Food Safety Act through the DOST Integrated Food Safety Program. Technical Working Groups formed in 2021—comprising DOST Councils, Research and Development Institutes, and Regional Offices—lead various program components. The R&D TWG is headed by PCIEERD; S&T Services by the Food and Nutrition Research Institute (FNRI); Human Resource Development by DOST-CALABARZON; and Knowledge and Technology Transfer and Policy Advocacy by the Technology Application and Promotion Institute (TAPI) and the National Research Council of the Philippines (NRCP).

Since 2021, the program has supported 15 projects with Php 177.9 million in funding, resulting in 227 trained food safety officers, 77 potential DOST risk assessors, 49 food safety manuals and protocols, upgraded laboratories, several publications, and updated national standards. Improved compliance has also been observed among food MSMEs, with 648 meeting food safety requirements and 180 securing FDA License-to-Operate. The Council continues to strengthen the program, with priorities refined by the DOST Food Safety R&D Technical Working Group, and two (2) new projects approved in 2025.

Priorities

Under *Food Safety Research & Development:*

- Development of MSMEs' Traceability Systems
- Development of DNA Metabarcoding and Spectroscopic Techniques for food authenticity and traceability of local products

Specific Features Sought in the Call:

- Clearly presented values or the corresponding opportunity cost for the proposed interventions. This can include details on potential socio-economic impact in terms of the projected increase in productivity of risk managers or additional income of industry, as well as potential benefits in terms of public health.
- Defined partnerships or collaborations with food safety regulatory agencies and other relevant institutions for the project implementation and sustainability of operations

Target Number of Projects: 2
Total Budget: 30M

III. DOST Halal S&T Program

The Philippine Halal Industry Development Strategic Plan 2024–2028 aims to position the Philippines as a leading halal- friendly hub in the Asia Pacific region by fostering a collaborative, customer centric, and competitive ecosystem. The national targets include attracting ₱230 billion in investments, generating 120,000 jobs, and achieving a 20% annual growth rate for halal-compliant enterprises.

As part of the Philippine Halal Export Development Board under RA 10817, the DOST implements the Halal S&T Program to provide scientific and technical support for the industry's development. The program covers four key areas: (1) Research and Development, (2) Human Resource Development, (3) Knowledge Transfer and Policy Advocacy, and (4) Halal Verification Laboratory Testing. These initiatives strengthen industry capabilities, enhance standards for global competitiveness, and promote broader halal awareness.

Since 2021, there are 15 projects implemented under the DOST Halal S&T program handled by PCIEERD, with a total funding support of Php 40.3M. Through the program, DOST established the 4 Halal Verification Laboratories in CALABARZON, Davao, Region 12, and BARMM that support Halal testing of food products. There were also 14 developed Halal Assurance System manuals, modules, and protocols for food products and ingredients for adoption by local Halal food processors. Policies were put forward with 6 regional development and DOST Halal Committee Resolutions. The Human Resource Development component also provided capacity building for 55 certified Halal lead auditors and 31 DOST Halal trainers ready for service to MSMEs. Through the program, there were 44 companies assisted and 2,293 industry personnel trained for Halal compliance.

To continue its holistic intervention in strengthening the Halal ecosystem of the country, the Council maintains the priorities on Halal as consulted with the DOST Halal S&T Program TWG led by DOST XI in November 2025.

Priorities

Under Halal *Research and Development*

- Halal Modest Fashion

Under Halal *Knowledge Transfer and Policy Advocacy:*

- Establishment of Halal Knowledge Center as central repository with online database of R&D output and Halal-related activities

Specific Features Sought in this Call:

- For the Halal Knowledge Center:
    - Endorsement by the DOST Halal S&T Program Leader
    - Strategic location in establishing the center and provide the capacity and how the operationalization will take place after the project completion.

Target Number of Projects: 2
Total Budget: 20M

Process Sector

PCIEERD under the Process Sector covers the process industries where the primary production processes are either continuous or occur on a batch of materials that is indistinguishable such as chemicals, pharmaceuticals, petroleum, plastics, rubber, textiles, tobacco, food, beverages, etc. as cited by IISE (Institute of Industrial and Systems Engineers, US).

The Process Sector of PCIEERD invites Research and Development proposals for the following programs to assist specific key industries in the country:

A. Natural Products Program
B. *Chemical and Biological Manufacturing and Allied Industries Program* for (a) Green Polymer
C. Textiles Program
D. Agro-Industrial Processing Program

With CFP 2027, the Process Sector aims to:

1. Assist the identified sub-sectors in their S&T needs through R&D Programs and interventions resulting to increased competitiveness of the industry
2. Engage the R&D Institutes and Academe in collaboration with the industry in developing R&D programs for the identified research calls
3. Contribute to the development of the industries by enabling R&D programs that are anchored/aligned to the following:
    1.4 Existing PCIEERD Roadmaps or its corresponding industry roadmap from government agencies (e.g., DTI and DA)
    2.4 DOST Harmonized National R&D Agenda 2022-2028 under Section 4.II.V Industry, Energy and Emerging Technology Research and Development Agenda 2022-2028
    3.4 Philippine Medium-Term Development Plan 2023-2028 under Chapter 8 Advance Research and Development, Technology and Innovation in support to Outcome2: Market-driven and customer-centered research and development and Outcome 3: Technology extension, adoption, utilization, and commercialization scaled-up.
    4.4 Goal 9 of the Sustainable Development Goals, specifically under 9.5 *Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending*

A. NATURAL PRODUCTS PROGRAM

The Natural Products subsector is the program focused on products from extraction and downstream processing from agricultural and marine sources (Colors, Gums, Resins, and Oils) that would serve the needs of various industries such as personal care, cosmetics, food, household products, and non-active components of pharmaceuticals which do not claim medical

or health benefits on the top diseases (e.g. pneumonia, heart disease, etc.) prevalent in the Philippines.

Call Rationale

According to Business Research Insights, the global natural and organic cosmetics market was valued at USD 11.51 billion in 2023 and is projected to grow at a CAGR of 7.5%, reaching USD 22.06 billion by 2032. The growth of the natural and organic products market is driven by a rising preference for natural personal care products, attributed to health awareness and concerns over synthetic ingredients. Consumers are increasingly drawn to the proven safety and effectiveness of natural ingredients, along with increasing demands for transparency in product composition. Growing awareness of the benefits of natural formulations further accelerates market expansion. These trends highlight significant opportunities for innovation and expansion in the industry (www.technavio.com, www.thebusinessresearchcompany.com).

On November 2025, a stakeholder consultation meeting with the Philippine Society of Cosmetic Science and local cosmetic companies were conducted to review the roadmap's midterm action plan for the 2027 to 2028 period. During the meeting, several pressing challenges were identified by the industry partners with highlight on emerging technologies for processing of natural products for cosmetic applications. The call also addresses the anticipation of functional cosmetics in the regulatory framework.

Call objective

The objective of this call is to develop innovative technologies to enhance quality and even create new market segments for the use of natural products. This is to take advantage of the momentum driven by strong market demand on natural products with wide array of industrial application: food additives such as flavors and fragrances, and colors for food, also colors for textiles and paint, dyes, industrial enzymes as catalysts, and natural polymers that may not be commonly associated with the popular natural products. It will utilize indigenous resources through provision of relevant technologies that results in increased yield, improved quality, and a more cost-effective process.

Call scope

The R&D proposal may include the following potential study areas:

1. Extraction, Characterization and Standardization of Natural Products for high value industrial applications
2. Extraction, Characterization of natural products with the use of Emerging Technologies - pulsed electric field (PEF), high pressure processing (HPP), Carbon dioxide (CO_2) extraction
3. Development of Evidence-Based Functional Cosmetic Ingredients and Formulations

Specific Features Sought in this Call

The proposals should demonstrate the following key characteristics and should be well-written in the documents. Missing any of these components will result in lower prioritization:

1. Must result from industry consultations and address the specific needs outlined in the roadmap.
2. Must have a comprehensive review of existing literature, ensuring the proposal concept is not redundant with ongoing local research.
3. Must have a Technology Readiness Level (TRL) between 4 and 7, demonstrating technical feasibility through an established proof of concept. Proposals intending to establish proof of concept TRL 1-3 will not be prioritized.
4. Must consider both the supply chain for raw materials and the long-term viability of the finished product.
5. Must strongly engage key players across the value chain (ie. upstream, midstream, and downstream partners) is essential for the successful development and commercialization of a product or technology.

   We define upstream as the source of raw materials or inputs; midstream refers to the stage where the product or service is manufactured or processed; and downstream represents the end-users who typically influence the product's performance, characteristics, and competitive pricing.

   a. Each partner's role should be clearly defined, specifying their responsibilities, contributions, and any counterpart funding that supports the project.
   b. A commitment letter from industry partners showing interest in the product's commercialization, ideally confirming their use of the resulting technology.
6. Must demonstrate a robust economic analysis to support the proposed product's financial sustainability.
7. The proposed budget for R&D should be commensurate with the market demand for innovation, product improvement, and the technologies being developed. It is crucial to allocate resources based on the expected impact and potential return on investment, ensuring that R&D efforts align with evolving consumer needs or market gaps.
8. For project leaders with on-going projects, updated reports for their respective projects should be submitted (i.e. technical progress and terminal and audited financial report). For completed projects, clearance from the funding agency from any obligations under the project.

PCIEERD will fund/endorse at least 2-3 projects and not to exceed Php 70 M budget covering all projects. The maximum duration for each project is 2 years.

B. CHEMICAL AND BIOLOGICAL MANUFACTURING AND ALLIED INDUSTRIES PROGRAM

This program will be carried out by supporting R&D initiatives on but not limited to, chemicals and allied industries, and food products. The products cover basic and specialty chemicals, manufacturing products by predominantly chemical processes [2], chemical preparations [3], sensors, chemical and biological reference materials and standards, and related technologies.

This program will also support the research agenda of the Philippine Chemical Industry Roadmap 2023-2028: Enabling Industry Linkages, Sustainability, Safer Materials and Operations, and Productivity of the *Samahan sa Pilipinas ng mga Industriyang Kimika* (SPIK).

Call rationale

Green Polymer Research

The Philippines has continuously contributed to the solid waste crisis which is projected to increase by 165% by 2025. In October 2022, key stakeholders convened in a national forum organized by the United Nations Development Programme (UNDP) together with the government of Japan and DENR to discuss the position of the Philippines in the Circular Economy and revisit the plans to avert pressing climate crisis through the commitment of the Philippines in the Paris Agreement of 75% greenhouse gas emission reduction by 2023.

In line with this, The Extended Producer Responsibility Act of 2022 (EPR Law) was enacted in July 2022 requiring large companies to recover a certain percentage of their annual use of plastic in packaging materials.

On 10 October 2024, the Science Technology and Innovation for Circular Economy (STI4CE) Framework was launched. It is designed to integrate science, technology, and innovation into the transition towards a circular, green, and sustainable economy. In the launching, research areas under the following thematic areas were identified:

1. **Think Green** *Understanding, planning, and attitude towards circular economy*
2. **Make Green** *Cleaner processes, waste valorization and treatment technologies*
3. **Turn Green** *Technology Transfer and Commercialization*
4. **Keep Green** *Strategic actions towards sustainability*

In support of this initiative, the Process Sector will contribute by enabling the Make Green and Turn Green research areas through the development of sustainable polymers from locally sourced raw materials towards a more circular economy.

Call objective

This call aims to support R&D programs that will improve and develop technologies to enhance chemical and biological manufacturing and allied industries with economic, trade, human security, and health relevance. This is to also position the Philippines in a competitive advantage through a scientific-enabled research framework.

Call scope

The R&D proposal may include the following potential study areas:

1. Low-cost technology on performance improvement of sustainable polymers
2. Valorization of agricultural wastes towards high-value industrial applications
3. Innovative Approaches for the Safe Use and Regulatory Compliance of Controlled Chemicals

Specific Features Sought in this Call

The proposals should demonstrate the following key characteristics and should be well-written in the documents. Missing any of these components will result in lower prioritization:

1. Must result from industry consultations and address the specific needs outlined in the roadmap.
2. Must have a comprehensive review of existing literature, ensuring the proposal concept is not redundant with ongoing local research.
3. Must have a Technology Readiness Level (TRL) between 4 and 7, demonstrating technical feasibility through an established proof of concept. Proposals intending to establish proof of concept TRL 1-3 will not be prioritized.
4. Must consider both the supply chain for raw materials and the long-term viability of the finished product.
5. Must strongly engage key players across the value chain (ie. upstream, midstream, and downstream partners) is essential for the successful development and commercialization of a product or technology.

   We define upstream as the source of raw materials or inputs; midstream refers to the stage where the product or service is manufactured or processed; and downstream represents the end-users who typically influence the product's performance, characteristics, and competitive pricing.

   a. Each partner's role should be clearly defined, specifying their responsibilities, contributions, and any counterpart funding that supports the project.
   b. A commitment letter from industry partners showing interest in the product's commercialization, ideally confirming their use of the resulting technology.
6. Must demonstrate a robust economic analysis to support the proposed product’s financial sustainability.
7. The proposed budget for R&D should be commensurate with the market demand for innovation, product improvement, and the technologies being developed. It is crucial to allocate resources based on the expected impact and potential return on investment, ensuring that R&D efforts align with evolving consumer needs or market gaps.
8. For project leaders with on-going projects, updated reports for their respective projects should be submitted (i.e. technical progress and terminal and audited financial report). For completed projects, clearance from the funding agency from any obligations under the project.

PCIEERD will fund/endorse at least 3 projects not to exceed Php 50M budget covering all projects. The maximum duration for each project is 2 years.

C. TEXTILE PROGRAM

The Textile sub-sector covers products that develop and make use of fibers, yarn intermediates, yarns, fabrics, and end-user products that retain all the strength, flexibility, and other typical properties of the original fiber or filaments. This is based on the Standard Terminology Relating to Textiles, ASTM D123 – 19.

Call rationale

According to the Philippine Statistics Authority, as of November 2024, the textile industry contributes 1.01% (~Php 28.170 billion, based on constant 2018 prices) to the gross value added in the Philippine Manufacturing sector. [Q3 2024 NAP PSA] The year-on-year value on production index of manufacturing textiles registered a growth rate of 0.65% in January-October 2024 compared to a decrement of 0.60% in the same period of 2023. In terms of the value of net sales index, the manufacture of textiles rose to a positive annual growth rate of 3.16% in January-October 2024 from its decline rate of 1.09% in the same period of 2023. [MISSI 2024, MISSI 2023] In the Philippine Export Development Plan, the target average annual growth rate for fabrics and wearable exports is 8.3% for 2023-2028. [PEDP 2023-2028] According to Foreign Buyers Association of the Philippines (FOBAP) President Robert Young, Philippine exports of a major end-product of textiles (apparel) are projected to reach a value of $1 billion in 2025 due to a favorable environment created by the start of free trade agreement with South Korea and incentives under the Corporate Recovery and Tax Incentives for Enterprises (CREATE) Act. [Apparel exports seen to hit $1 billion next year - FOBAP] With an ever-increasing apparel and industrial demand for textiles and growing awareness on the environmental impacts of its life cycle, there is an expected surge in demand for natural fibers as consumers shift to a more sustainable product option. [https://www.grandviewresearch.com/industry-analysis/textile-market]

Between 06-21 November 2024, various industry stakeholders were consulted to review the roadmap's midterm plan for 2027 to 2028 period. The industry's needs became apparent with a universal call to increase the utilization of local natural fibers (i.e. abaca) and develop a more sustainable, cost-effective, and efficient means of fiber processing and functionalization. However, a common sentiment among the stakeholders is the difficulty of processing and blending natural fibers with other commercial fibers.

In line with these themes, the R&D priority areas on local and sustainable fiber sources, processing, and finishing are reflected in the call scope.

Call objective

The objective of this call is to support R&D programs that will improve and develop technologies to enhance textile production using natural fibers and other low-cost, sustainable and comparable sources and create new materials for textiles with improved properties. To contribute to the

economic status of the Philippine Textile industry, the market value of the target products should be highlighted to esteem endorsement for R&D support.

Call scope

The R&D initiatives may include the following potential study areas:

1. Regenerated cellulose fiber with high market demand and sustainable source
2. Cost-effective recycling of post-industrial polymers and textile wastes to produce filaments and staples
   2.1 low-cost process with high industry impact
   2.2 novel or advanced recycling methods to improve quality of recycled fibers
3. Technology interventions to improve incorporation of local natural fibers

Specific Features Sought in this Call

1. Must result from industry consultations and address the specific needs outlined in the roadmap.
2. Must have a comprehensive review of existing literature, ensuring the proposal concept is not redundant with ongoing local research.
3. Must have a Technology Readiness Level (TRL) between 4 and 7, demonstrating technical feasibility through an established proof of concept. Proposals intending to establish proof of concept TRL 1-3 will not be prioritized.
4. Must consider both the supply chain for raw materials and the long-term viability of the finished product.
5. Must strongly engage key players across the value chain (ie. upstream, midstream, and downstream partners) is essential for the successful development and commercialization of a product or technology.

   We define upstream as the source of raw materials or inputs; midstream refers to the stage where the product or service is manufactured or processed; and downstream represents the end-users who typically influence the product's performance, characteristics, and competitive pricing.

   a. Each partner's role should be clearly defined, specifying their responsibilities, contributions, and any counterpart funding that supports the project.
   b. A commitment letter from industry partners showing interest in the product's commercialization, ideally confirming their use of the resulting technology.
6. Must demonstrate a robust economic analysis to support the proposed product’s financial sustainability.
7. The proposed budget for R&D should be commensurate with the market demand for innovation, product improvement, and the technologies being developed. It is crucial to allocate resources based on the expected impact and potential return on investment, ensuring that R&D efforts align with evolving consumer needs or market gaps.
8. For project leaders with on-going projects, updated reports for their respective projects should be submitted (i.e. technical progress and terminal and audited financial report). For completed projects, clearance from the funding agency from any obligations under the project.

PCIEERD will fund/endorse at least 3 projects not to exceed Php60M budget covering all projects. The maximum duration for each project is 2 years.

D. AGRO-INDUSTRIAL PROGRAM

The Agro-industrial Program is the sub-sector of the economy where farming meets technology. The main focus of this sub-sector is to uplift the lives of the country's farmers by introducing research and development to boost productivity, to improve existing products and create new ones, and to support or change existing policies with science.

This sub-sector complements ISPs of PCAARRD, where PCAARRD focuses on upstream industry, which covers genomics, plant cultivation, and up to harvest; while PCIEERD handles the R&D on the downstream processes - product development, by-products processing and/or conversion, and other post-harvest processing.

For CFP CY 2026, one commodity will be prioritized based on active initiatives of industries that expressed and supported the research agenda on the downstream processing of rubber. Recognizing the market opportunity on other high-value crops such as citrus, mango, rice, sweet potato, tropical fruits, and sugarcane, value adding technologies supported by industry demand will also be considered for funding to support the global competitiveness of the sector.

Call rationale

Rubber

According to the Association of Natural Rubber Producing Countries (ANRPC), the global consumption of rubber increased by 3.5% year-on-year. Moreover, the Persistence Market Research projected that the Rubber Industry will witness a CAGR of 5.8% during the period 2024 to 2031. The demand is expected to increase from USD 25.2 billion in 2024 to USD 37.5 billion USD by the end of 2031. Due to its low cost and versatility as lightweight material, natural rubber attracts demand across diverse sectors such as construction, pharmaceuticals, construction, etc.

Despite the demand, the rubber industry currently faces several issues. Last 19-21 November 2025, the Philippine Rubber Research Institute conducted the National Rubber Stakeholder Consultation and Updating of the Philippine Rubber Industry Roadmap 2023-2026. The downstream research and development topic needs were identified with emphasis on technologies to valorize rubber wastes and development of natural or synthetic elastomers that offer lower environmental impact to respond to the global shift towards green products and processes.

Call objective

The objective of this call is to foster technological advancement fit for Philippine high-value crops and commodities that are significant economic drivers. The resulting products or technologies should be low-cost, efficient, and robust to support countryside development and inclusive growth.

Call scope

The R&D proposal may include the following potential study areas:

1. Valorization of rubber waste, particularly from sources like spent tires and rubber products, aiming to turn waste into valuable materials through various processes
2. Develop new types of natural or synthetic elastomers that offer better performance or lower environmental impact

Specific Features Sought in this Call

Must result from industry consultations and address the specific needs outlined in the roadmap.

1. Must have a comprehensive review of existing literature, ensuring the proposal concept is not redundant with ongoing local research.
2. Must have a Technology Readiness Level (TRL) between 4 and 7, demonstrating technical feasibility through an established proof of concept. Proposals intending to establish proof of concept TRL 1-3 will not be prioritized.
3. Must consider both the supply chain for raw materials and the long-term viability of the finished product.
4. Must strongly engage key players across the value chain (ie. upstream, midstream, and downstream partners) is essential for the successful development and commercialization of a product or technology.

   We define upstream as the source of raw materials or inputs; midstream refers to the stage where the product or service is manufactured or processed; and downstream represents the end-users who typically influence the product's performance, characteristics, and competitive pricing.

   a. Each partner's role should be clearly defined, specifying their responsibilities, contributions, and any counterpart funding that supports the project.
   b. A commitment letter from industry partners showing interest in the product's commercialization, ideally confirming their use of the resulting technology.
5. Must demonstrate a robust economic analysis to support the proposed product’s financial sustainability.
6. The proposed budget for R&D should be commensurate with the market demand for innovation, product improvement, and the technologies being developed. It is crucial to allocate resources based on the expected impact and potential return on investment, ensuring that R&D efforts align with evolving consumer needs or market gaps.
7. For project leaders with on-going projects, updated reports for their respective projects should be submitted (i.e. technical progress and terminal and audited financial report). For completed projects, clearance from the funding agency from any obligations under the project.

PCIEERD will fund/endorse a maximum of 2 projects not to exceed Php35M budget covering all projects. The maximum duration for each project is 2 years.

Mining and Minerals Sector

Call Rationale

The Philippines is one of the world's most mineral-rich countries, with vast reserves of nickel, copper, gold, chromite, cobalt, rare earth elements (REEs), and other critical minerals. After more than a decade of delayed reforms, the mining sector is regaining momentum due to improved policy stability, modernized permitting, environmental oversight, and legislative reforms such as the PENCAS Law and RA 12253 (Enhanced Fiscal Regime for Large-Scale Metallic Mining Act).

This renewed stability coincides with rapidly increasing global demand for energy-transition and high-tech minerals, positioning the Philippines to play a major role in critical mineral supply chains for batteries, renewable energy, electric vehicles, and advanced manufacturing. Currently, the country exports mostly raw ores, capturing minimal downstream value.

Despite this potential, the mining sector faces challenges in sustainable resource use, environmental protection, occupational safety, and socio-economic impacts on mining communities. There is an urgent need for research, innovation, and technology development that ensures responsible extraction, processing, and utilization of minerals while contributing to industrialization, low-carbon transition, and inclusive growth.

This Call encourages initiatives that increase the economic value of minerals, reduce environmental impact, and promote social inclusiveness, helping the Philippines secure a competitive and sustainable position in the global minerals market.

Call Objectives

This Call aims to strengthen the Philippine mining sector by supporting research, innovation, and technology development that improve economic value, environmental sustainability, and social inclusiveness. Specifically, it seeks to:

1. Strengthen the Philippine mining sector by supporting research, innovation, and technology development that enhance economic value, promote environmental sustainability, and ensure social inclusiveness. It seeks to enhance the value of metallic minerals by developing technologies for the extraction and processing of critical metals, while also supporting innovations in metal product manufacturing.

2. Improve safety and efficiency in mining operations using advanced technologies.

3. Add value to non-metallic minerals through the development of technologies for industrial applications, including decarbonization. In addition, it seeks to support the extraction of critical minerals for emerging technologies by advancing offshore and onshore mineral exploration methods, improving resource assessment guidelines, innovating metallurgical processes for recovering high-value metals from ores, tailings, wastes, and unconventional sources.

4. Promotes sustainable mining and circular economy solutions by establishing circular value chains for small-scale mining communities, characterizing and repurposing mine wastes and

tailings for industrial use, carbon storage, and supporting community-inclusive mine rehabilitation and environmental innovation to reduce ecological and social impacts.

5. Strengthen research and innovation capacity by enhancing the capabilities of Higher Education Institutions (HEIs), Research and Development Institutes (RDIs), and research teams in mining and mineral technology, while fostering collaboration across government, industry, and academia to align research with the country's goals for industrialization, low-carbon transition, and sustainable development.

Call Scope:

For the 2028 Call for Proposals (CFP), the research priority areas in the Mining and Minerals Sector are as follows:

A. VALUE-ADDING OF METALLIC MINERALS

1. Development of extraction and recovery methods for gold and associated metals from complex/low grade ores.
2. Development of technologies for the production of nickel metal products, including powder, briquettes, plates, and cathodes from nickel ores
3. Development of processing technologies for the production of high-grade ferronickel from nickel ores for use in stainless steel manufacturing.
4. Design, development, and validation of sensor-based systems for underground personnel tracking and safety management.
5. Development and implementation of advanced dust suppression technologies for mining operations.
6. Development of Automatic Draft Survey (ADS) systems for bulk ore carriers, enabling accurate, real-time measurement of ore cargo weight and distribution during shipping operations.

B. VALUE-ADDING OF NON-METALLIC MINERALS PROGRAM

1. Development of technologies utilizing limestone for decarbonization applications, including carbon capture, utilization, and storage (CCUS) and low-carbon industrial processes.
2. Development of technologies utilizing pyrite as a feedstock for sulfuric acid production.
3. Development of technologies utilizing lahar/volcanic ash as a sustainable source of silica for wafer and glass manufacturing.

C. EXTRACTION OF CRITICAL MINERALS FOR EMERGING TECHNOLOGY APPLICATION PROGRAM

1. Development of innovative methodologies and guidelines for offshore mineral reserve assessment, exploration, and extraction.

2. Development of advanced metallurgical processes for the extraction and recovery of high-value metals from mineral ores, tailings, wastes, (metal scrap from wrecked ship) and novel or unconventional sources for high tech of emerging technology applications, including the following:

2.1 Recovery of rare earth elements (REEs) for permanent magnets used in wind turbines and electric vehicles;

2.2 Recovery of copper, zinc, lead, silver, and gold from volcanic deposits (e.g., lava, lahar and ash deposits).

2.3 Recovery of lithium and other metals from geothermal brines.

3. Development of technologies enabling the utilization of natural hydrogen for low-carbon and sustainable steelmaking.
4. Development of technology to recover vanadium from slags and mill scales

TECHNOLOGIES IN SUPPORT OF MINE REHABILITATION PROGRAM

1. Establishment of a circular value chain for small scale mining industry.
2. Mine Waste Characterization and Valorization: Assessing Long-Term Feasibility for Carbon Storage, Phytomining in Mined-Out Areas, and Community-Integrated Waste Repurposing.
3. Development of technology to treat and utilize tailings for industrial applications.

The priorities outlined above are aligned with the updated Mining and Minerals Sector R&D Roadmaps, which were developed in consultation with DOST Mining and Minerals stakeholders through focus group discussions (FGDs), roundtable discussions (RTDs), workshops, surveys, and small group meetings in 2025.

Reminder: *Before submitting your proposal, please make sure to carefully review the* ***Specific Features Sought in this Call****, located at the end of the* ***Mining and Minerals Sector Call for Proposal*** *write-up. Ensuring your proposal aligns with these features is critical for eligibility and consideration.*

DETAILS OF RESEARCH PRIORITIES:

PROGRAM AREA: VALUE-ADDING OF METALLIC MINERALS PROGRAM

Research Priority: 1. Development of Extraction and Recovery Methods for Gold and Associated Metals Extraction from Complex and Low-Grade Ores

Call Rationale

The Philippines is richly endowed with gold resources. In 2023, the country's total gold reserves were estimated at approximately 3.69 million kilograms (Gold Reserves Volume in the Philippines, Christa Balita). In the same year, 12 primary producers generated a gold production value of approximately PhP 106.53 billion (Mines and Geosciences Bureau). Gold accounted for 38.21% of the total resource rent from the four major minerals, gold, copper, nickel, and chromite, amounting to PhP 57.66 billion, or 0.24% of the Gross Domestic Product (GDP) (Philippine Statistics Authority). These figures underscore the critical role of gold and its associated metals in the country's mineral sector and overall economy.

The Philippines hosts a diverse range of complex gold ore deposits, including epithermal lode, vein-type, and alkaline-type deposits. While these deposits represent substantial untapped

potential, many remain underutilized due to the technical challenges associated with processing complex and low-grade ores. Given gold's significant contribution to national economic growth, there is a pressing need to develop advanced, high-recovery, and environmentally responsible processing technologies to sustain and enhance the sector's economic impact.

Complex gold ores are typically characterized by gold closely associated with other metals, such as copper, tellurium, bismuth, antimony, platinum group metals, silver, arsenic, and iron. The presence of these associated elements complicates extraction and necessitates advanced processing technologies to achieve high recovery rates. Moreover, the occurrence of arsenic, a toxic heavy metal, requires stringent environmental safeguards and compliance with environmental regulations, thereby increasing technical complexity and processing costs.

In response to these challenges, and in consultation with mining and minerals stakeholders, the Department of Science and Technology–Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD) has identified the development of advanced, high-recovery, and environmentally responsible technologies for processing complex and low-grade gold ores and their associated metals as a priority research area under this Call

Call Objective

To develop advanced, high-recovery, and environmentally responsible processing technologies for complex and low-grade gold ores and their associated metals, such as copper, tellurium, bismuth, antimony, and platinum group metals, ensuring a secure and sustainable supply, promoting resource efficiency, and supporting inclusive, long-term economic growth.

Call Scope:

The proposal should focus on the following:

1. Advanced extraction and beneficiation techniques for complex and low-grade gold ores and their associated metals.
2. Environmentally sound processing methods, including arsenic management.
3. Process optimization to improve recovery, efficiency, and sustainability.
4. Inclusion of a techno-economic analysis and/or feasibility study.
5. Validation of the developed technologies up to Technology Readiness Level (TRL) 3 through laboratory.

The proposal should clearly identify measurable outputs, including but not limited to:

1. Optimized process flow and operating parameters.
2. Demonstrated improvement in gold and associated metals recovery and processing efficiency.
3. Environmental impact assessment and mitigation strategies.
4. Cost–benefit analysis and/or techno-economic feasibility study.
5. Patent application, utility model, or other IP outputs (where applicable).
6. Comprehensive technical report and industry-ready recommendations.
7. Trained researchers and technical personnel.
8. Validation of the developed technologies up to Technology Readiness Level (TRL) 3 through laboratory demonstrations

Budget and Duration:

The maximum budget allocated for this research priority is Php 20,000,000.00, with a project duration of two (2) years, covering Calendar Years (CY) 2027–2028.

Research Priority: 2. Development of technologies for the production of nickel metal products, including powder, briquettes, plates, and cathodes from nickel ores

Call Rationale

Global demand for refined nickel metal products is increasing rapidly, driven by the accelerating growth of battery manufacturing, electric vehicles (EVs), renewable energy technologies, and advanced engineering applications. Nickel is a critical component in lithium-ion battery chemistries, particularly for high-nickel cathode materials used in EVs and energy storage systems, which require refined nickel products with high purity and consistent quality. As countries pursue decarbonization and energy transition strategies, demand for battery-grade and refined nickel metal is projected to grow significantly over the coming decades.

While the Philippines is one of the world's leading suppliers of nickel ore, the country's nickel industry remains largely focused on upstream activities, with limited domestic capacity for producing refined nickel metal products. This includes powders, briquettes, plates, and cathodes, which are key forms required for batteries, advanced alloys, and industrial applications, resulting in missed opportunities for downstream value addition and participation in higher-value segments of the global nickel supply chain.

The majority of Philippine nickel resources are lateritic and increasingly low-grade, which presents significant technical and economic challenges for conventional refining routes aimed at producing high-purity nickel metal. Laterite ores are characterized by complex mineralogy, high iron content, and variable composition, often requiring energy-intensive and capital-heavy processing technologies to achieve acceptable metal recovery rates. These challenges are further compounded by local energy costs and environmental considerations, underscoring the need for processing technologies that are specifically adapted to Philippine operating conditions.

In response to these challenges, and following consultations with stakeholders from the mining, minerals processing, and manufacturing sectors, the Department of Science and Technology–Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD) has identified the development of technologies for the production of nickel metal products as a priority research area under this Call. Strengthening local capabilities in nickel metal processing is expected to promote industrial diversification, enhance domestic value addition, improve the utilization of low-grade nickel resources, and enable the Philippines to play a more active and strategic role in battery, EV, and energy-transition supply chains.

Call Objective

To develop technically viable, economically feasible, and environmentally responsible technologies for producing refined nickel metal products, including powder, briquettes, plates, and

cathodes, from Philippine nickel ores, thereby enabling downstream processing, value addition, and integration into emerging high-value nickel markets.

Call Scope:

The proposals should focus on the development of nickel metal production technologies, including but not limited to the following:

1. Extraction and refining routes for producing high-purity nickel metal from lateritic or other nickel ores, particularly low-grade resources.
2. Processing and shaping of refined nickel into value-added forms such as the following:
    a. Nickel powder (fine particles) for batteries, catalysts, sintered parts
    b. Nickel briquettes for alloy making
    c. Nickel plates (flat sheets) for fabrication and plating
    d. Nickel cathodes (high purity electro-nickel) for battery, alloy, chemical industries
3. Process optimization to improve metal recovery, energy efficiency, product quality, and cost-effectiveness under local conditions.
4. Integration of environmentally responsible practices, including waste minimization, recycling, and by-product recovery.
5. Inclusion of a techno-economic analysis and/or feasibility study
6. Validation of the developed technologies up to Technology Readiness Level (TRL) 3 through laboratory scale testing.

Expected outputs should include validated laboratory scale nickel metal production technology (TRL 3), demonstrated production of nickel metal products meeting target specifications, optimized process flowsheets and operating parameters, environmental performance assessments, techno-economic analysis and/or feasibility study, intellectual property outputs (where applicable), comprehensive technical documentation, and trained researchers and technical personnel.

Budget and Duration

The maximum budget allocated for this research priority for the four (4) target technologies is Php 20,000,000.00 (Php 5,000,000.00 per technology), with a project duration of two (2) years, covering Calendar Years (CY) 2027–2028.

Research Priority: 3. Development of processing technologies for the production of high-grade ferronickel from nickel ores for use in stainless steel manufacturing

Call Rationale

Ferronickel is a critical alloying input in stainless steel production, a sector that continues to demonstrate strong and stable global demand due to its essential use in construction, automotive, appliances, and industrial machinery. As one of the world's leading suppliers of nickel ore, the Philippines plays a key role in supporting international stainless steel value chains. However, domestic production of high-grade ferronickel, whether in lump, pellets, or alloyed forms suitable for direct use in stainless steel manufacturing, remains limited, with much of the processing and value addition occurring overseas. This limits the country's participation in higher-value segments of the global nickel market and reduces opportunities for domestic industrial growth.

Producing ferronickel that meets the strict grade, chemical composition, and consistency requirements of stainless-steel manufacturers requires advanced processing technologies. Conventional ferronickel processing routes, including rotary kiln-electric furnace (RKEF) and smelting processes, are energy-intensive, capital-demanding, and may not be optimized for maximizing metal recovery, improving energy efficiency, and ensuring product quality. As stainless steel producers increasingly demand consistent, high-quality ferronickel, there is an urgent need for innovative processing technologies that enhance operational efficiency, reduce production costs, and improve overall process economics.

In response to these challenges, and based on consultations with stakeholders from mining, metallurgical, and stainless steel manufacturing sectors, the Department of Science and Technology - Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD) has identified the development of processing technologies for producing high-grade ferronickel as a priority research area under this Call. Strengthening domestic ferronickel processing capabilities will support value-added downstream integration into the stainless steel supply chain, improve industrial competitiveness, and reinforce the Philippines' position as a major supplier of high-quality ferronickel to global markets.

Call Objective

To develop efficient, cost-effective, and environmentally responsible processing technologies for producing high-grade ferronickel from Philippine nickel ores, supporting downstream integration into the stainless steel value chain and enhancing the long-term competitiveness of the Philippine nickel industry.

Call Scope

The proposal should focus on the development and improvement of ferronickel processing technologies, including but not limited to the following:

1. Processing and smelting routes for producing high-grade ferronickel from lateritic and other nickel ores, with emphasis on low-grade ore utilization.
2. Process innovations to improve nickel recovery, alloy grade, and consistency suitable for stainless steel manufacturing.
3. Optimization of energy use, reductant consumption, and operating parameters to improve economic feasibility under local conditions.
4. Integration of environmental management measures, including emissions reduction, slag utilization, and waste minimization.
5. Inclusion of a techno-economic analysis and/or feasibility study
6. Validation of the developed technologies up to Technology Readiness Level (TRL) 3 through laboratory.

Expected outputs should include a validated ferronickel production process or flowsheet (TRL 3), demonstrated production of ferronickel meeting target grade specifications, optimized operating parameters, environmental performance assessment, techno-economic analysis and/or feasibility study, intellectual property outputs (where applicable), comprehensive technical documentation, and trained researchers and technical personnel.

Budget and Duration:

The maximum budget allocated for this research priority is Php 10,000,000.00, with a project duration of two (2) years, covering Calendar Years (CY) 2027–2028.

Research Priority: 4. Design, development, and validation of sensor-based systems for underground personnel tracking and safety management

Call Rationale

Underground mining operations present significant occupational health and safety challenges due to confined spaces, complex tunnel networks, poor visibility, and exposure to hazards such as poor air quality, ground instability, flooding, and equipment-related accidents. Ensuring the safety and real-time monitoring of underground personnel is a critical concern for mining companies, regulators, and workers alike.

Currently, many underground mining operations in the Philippines rely on manual monitoring, basic radio communication, or limited-location tracking systems. These approaches are often inadequate for accurately tracking personnel, monitoring environmental conditions, and enabling rapid response during emergencies such as cave-ins, gas leaks, fires, or flooding. The absence of real-time monitoring can result in delayed rescue operations, higher risk of injuries, and reduced operational efficiency.

Advances in sensor technologies, wireless communications, Internet of Things (IoT), and data analytics provide opportunities to improve underground mine safety. Sensor-based personnel tracking systems integrating wearable devices, environmental sensors, and centralized monitoring platforms can provide real-time visibility of worker movement, detect environmental hazards, and facilitate timely emergency responses. Such systems enhance proactive risk management, compliance with occupational safety regulations, and overall operational safety.

However, underground mining environments pose unique technical challenges, including signal attenuation, power limitations, harsh conditions, and system interoperability. Hence, there is a pressing need to design, develop, and validate robust, cost-effective, and locally adaptable sensor-based systems tailored to underground mining operations in the Philippines.

In response, and in consultation with mining and minerals stakeholders, the DOST-PCIEERD has identified this research priority to strengthen mine safety, enhance emergency preparedness, and support the adoption of smart and responsible mining practices.

Call Objective:

To develop, test, and validate sensor-based systems for underground personnel tracking and safety management that provide real-time monitoring, enhance emergency response, and improve overall occupational safety in Philippine underground mining operations.

Call Scope:

The proposal should cover, but are not limited to, the following areas:

1. Design and development of wearable devices and environmental sensors suitable for underground mining conditions,
2. Integration of sensor networks, wireless communication protocols, and IoT platforms for real-time personnel tracking,
3. Development of centralized monitoring systems for safety management, including dashboards, alerts, and reporting tools,
4. System validation and testing in laboratory and simulated underground conditions,
5. Data analytics and predictive safety tools for hazard detection, incident prevention, and emergency response optimization and
6. Compliance with Philippine occupational health and safety standards (DOLE, DENR, Mine Safety Guidelines).
7. Inclusion of a techno-economic analysis and/or feasibility study

The proposal is expected to deliver the following outputs: (1) prototype sensor-based personnel tracking system for underground operations, (2) laboratory-scale and/or pilot-scale validation results demonstrating functionality and reliability, (3) integration framework for real-time data acquisition, monitoring, and alert systems, (4) environmental and operational resilience assessment for underground conditions, (5) technical documentation, including system architecture, user manuals, and standard operating procedures (SOPs), (6) cost–benefit analysis and feasibility study demonstrating scalability and sustainability, (7) intellectual property outputs, including patents, utility models, or proprietary technology (where applicable) and (8) capacity-building outcomes, including trained personnel and researchers in mining safety technologies

Budget and Duration:

The maximum budget allocated for this research priority is Php 5,000,000.00, with a project duration of two (2) years, covering Calendar Years (CY) 2027–2028.

Research Priority 5: Development and implementation of advanced dust suppression technologies for mining operations

Call Rationale:

Mining operations, particularly open-pit and underground extraction, generate significant quantities of dust, which poses serious health, environmental, and operational risks. Prolonged exposure to respirable dust, including silica and particulate matter, can cause respiratory diseases such as silicosis, chronic obstructive pulmonary disease (COPD), and other health complications. Dust emissions also degrade air quality, reduce visibility, increase machinery wear, and contribute to environmental pollution in surrounding communities.

Current dust control measures in Philippine mining operations, such as water spraying, chemical suppressants, and ventilation systems, are often limited in effectiveness, expensive to maintain, or insufficiently adapted to local conditions. The lack of advanced, cost-effective, and environmentally sustainable dust suppression technologies continues to pose challenges to occupational safety, regulatory compliance, and environmental protection.

Recent advances in nanomaterials, aerosol dynamics, smart sensors, and automated spraying systems provide opportunities to develop next-generation dust suppression solutions. These technologies can minimize airborne particulate concentrations, optimize water and chemical

usage, and enable real-time monitoring of dust levels. By implementing such solutions, mining operations can enhance worker safety, improve operational efficiency, and meet environmental compliance standards.

In response, and in consultation with mining stakeholders, the DOST-PCIEERD has identified the development and implementation of advanced dust suppression technologies as a priority research area. This initiative aims to protect miner health, reduce environmental impact, and promote sustainable and responsible mining practices in the Philippines.

Call Objective

To develop, implement, and validate advanced dust suppression technologies that effectively reduce airborne particulate matter in mining operations, enhance worker health and safety, and ensure compliance with environmental regulations.

Call Scope

The proposal should focus on, but are not limited to, the following:

1. Design and development of advanced dust suppression systems for open-pit and underground mines,
2. Implementation of smart and automated spraying systems using water, chemical suppressants, or nanotechnology-based solutions,
3. Integration with dust sensors and monitoring platforms for real-time control and optimization,
4. Testing and validation of dust suppression technologies in laboratory and operational mining conditions,
5. Reduction of water and chemical consumption while maintaining effective dust control
6. Valuation of environmental, operational, and health impacts of the developed technology and
7. Compliance with Philippine environmental and occupational health standards (DENR, DOLE-OSH, MGB regulations).
8. Inclusion of a techno-economic analysis and/or feasibility study

The proposal should deliver the following: (1) prototype or pilot-scale advanced dust suppression technology suitable for mining operations, (2) laboratory and/or field validation results demonstrating dust reduction efficiency, (3) integration with real-time monitoring systems for dust levels and environmental conditions, (4) operational guidelines, maintenance protocols, and standard operating procedures (SOPs), (5) cost-benefit analysis and feasibility study, including potential for large-scale adoption, (6) technical documentation, including design specifications, user manuals, and safety protocols, (7) intellectual property outputs, including patents or utility models (where applicable) and (8) capacity-building outcomes, including trained personnel in dust management and technology implementation.

Budget and Duration:

The maximum budget allocated for this research priority is Php 5,000,000.00, with a project duration of two (2) years, covering Calendar Years (CY) 2027–2028.

Research Priority: 6. Development of Automatic Draft Survey (ADS) systems for bulk ore carriers, enabling accurate, real-time measurement of ore cargo weight and distribution during shipping operations

Call Rationale

Accurate measurement of bulk mineral ore cargo weight and distribution is critical for safe, efficient, and compliant shipping operations in the mining sector. Traditional draft survey methods, which rely on manual measurements and calculations, are labor-intensive, time-consuming, and prone to human error. Inaccuracies in cargo weight and distribution can lead to operational inefficiencies, non-compliance with maritime regulations, and safety hazards, including vessel instability or overloading.

With the increasing volume of mineral ore exports from the Philippines, there is a pressing need for advanced, automated solutions that provide real-time, reliable measurements of cargo weight and distribution during shipping. Automatic Draft Survey (ADS) systems offer the potential to modernize bulk ore transport by integrating sensors, data analytics, and real-time monitoring, enhancing operational efficiency, maritime safety, and regulatory compliance.

In consultation with the DOST-PCIEERD Mining and Minerals Stakeholders, the development of ADS systems for mineral ore carriers has been identified as a priority research area to support the modernization and digitization of mineral logistics and transport operations in the Philippines.

Call Objective:

To develop Automatic Draft Survey (ADS) systems for bulk mineral ore carriers that provide accurate, real-time measurement of cargo weight and distribution, enhancing operational efficiency, maritime safety, and regulatory compliance in mining-related shipping operations.

Call Scope:

The proposal should focus on the following:

1. Design and development of ADS systems for bulk mineral ore carriers, incorporating sensors, software, and data analytics for real-time cargo measurement and monitoring.
2. Integration with existing shipboard and mining logistics systems for automated data collection, processing, and reporting.
3. Validation of system accuracy and reliability under operational conditions during the transport of mineral ores.
4. Optimization of data acquisition, processing, and visualization to support decision-making for cargo loading, stability management, and regulatory compliance.
5. Assessment of operational, economic, and regulatory impacts, including improvements in safety, efficiency, and cost-effectiveness.
6. Inclusion of a techno-economic analysis and/or feasibility study

Expected measurable outputs include: Prototype ADS system validated under real-world mineral ore transport conditions, demonstrated accuracy in cargo weight and distribution measurements, software and data analytics platform for real-time monitoring and reporting, technical guidelines

and standard operating procedures for ADS implementation in mining logistics, techno-economic feasibility study supporting scalability and industry adoption, intellectual property outputs (patents, utility models) where applicable and trained technical personnel for system deployment and operation

Budget and Duration:

The maximum budget allocated for this research priority is Php 5,000,000.00, with a project duration of two (2) years, covering Calendar Years (CY) 2027–2028.

PROGRAM AREA: VALUE-ADDING OF NON-METALLIC MINERALS

Research Priority: 1. Development of technologies utilizing limestone for decarbonization applications, including carbon capture, utilization, and storage (CCUS) and low-carbon industrial processes

Call Rationale

Limestone ($CaCO_3$) is one of the most abundant non-metallic minerals in the Philippines, with widespread applications in construction, cement manufacturing, agriculture, and soil management. Beyond its conventional uses, limestone has significant potential as a material for decarbonization technologies, including carbon capture, utilization, and storage (CCUS), and for enabling low-carbon industrial processes. The rising global focus on reducing greenhouse gas emissions and achieving net-zero targets has created a demand for innovative solutions that integrate limestone into environmentally responsible and sustainable technologies.

Despite its availability, utilization of Philippine limestone for advanced decarbonization applications remains largely unexplored. Developing processes that convert limestone into materials for CCUS, low-carbon lime production, or soil amendment can provide substantial environmental and economic benefits. This includes supporting agricultural productivity and soil management, reducing reliance on imported limestone and neutralizing agents, enabling the development of low-carbon lime production technologies, and creating localized livelihood and community-scale production opportunities.

In response to these opportunities and following consultations with industry, academic, and research stakeholders, the Department of Science and Technology–Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD) has identified the development of technologies utilizing limestone for decarbonization applications as a priority research area under this Call. Strengthening domestic capabilities in this sector will contribute to national climate goals, enhance the sustainability of industrial processes, and position the Philippines as a competitive player in the global low-carbon technology market.

Call Objective:

To develop technically viable, economically feasible, and environmentally responsible technologies that utilize limestone for decarbonization applications, including carbon capture, utilization, and storage (CCUS), and to integrate limestone-based solutions into low-carbon

industrial processes, thereby contributing to emission reductions and sustainable industrial development.

Call Scope:

The proposal should include, but are not limited to, the following:

1. Development and optimization of limestone-based materials for carbon capture, including sorbents, absorbents, and other functional derivatives.
2. Processes for utilizing limestone in carbon utilization pathways, such as mineralization, conversion into value-added products, or incorporation into industrial processes.
3. Integration of limestone-based technologies into low-carbon industrial processes, such as cement, lime, or chemical production, to reduce CO_2 emissions.
4. Environmental impact assessment, including life-cycle analysis and evaluation of CO_2 reduction potential.
5. Inclusion of a techno-economic analysis and/or feasibility study
6. Validation of developed technologies up to Technology Readiness Level (TRL) 3, through laboratory demonstrations.

Expected outputs should include validated laboratory limestone-based decarbonization technology (TRL 3), demonstrated CO_2 capture or utilization efficiency, optimized process parameters, environmental impact assessments, techno-economic feasibility study, intellectual property outputs (if applicable), comprehensive technical documentation, and trained researchers and technical personnel.

Budget and Duration

The maximum budget allocated for this research priority is Php 10,000,000.00, with a project duration of two (2) years, covering Calendar Years (CY) 2027–2028.

Research Priority: 2. Development of technologies utilizing pyrite as a feedstock for sulfuric acid production

Call Rationale:

Pyrite (FeS_2), commonly known as “fool’s gold,” is an abundant non-metallic mineral in the Philippines, often associated with base metal deposits. It is a valuable source of sulfur, which can be converted into sulfuric acid a critical industrial chemical used in fertilizers, mineral processing, metal refining (particularly nickel), chemical manufacturing, and battery material production (USGS, 2023). Globally, sulfuric acid demand continues to rise due to its essential role in agriculture and industrial processes, making locally sustainable production highly strategic.

Currently, much of the sulfuric acid used in the Philippines is imported or derived from conventional sulfur sources, limiting domestic industrial value addition. Utilizing pyrite as a feedstock provides an opportunity to produce sulfuric acid domestically, reducing supply risks, lowering operating costs for mining companies, and improving utilization of complex ores and mining by-products. Moreover, pyrite-based sulfuric acid production supports circular and integrated mineral processing, turning mining residues into valuable industrial inputs while promoting environmental sustainability.

In response to these opportunities, and following consultations with stakeholders from mining, chemical, and industrial sectors, the Department of Science and Technology–Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD) has identified the development of technologies utilizing pyrite for sulfuric acid production as a priority research area under this Call. Strengthening domestic pyrite-based sulfuric acid production capabilities will enhance industrial competitiveness, support the downstream processing of nickel and other minerals, and foster a more resilient and sustainable local chemical industry.

Call Objective:

To develop technically viable, economically feasible, and environmentally responsible technologies for producing sulfuric acid from pyrite feedstock, thereby enabling local value addition, improving industrial self-sufficiency, and supporting sustainable chemical production.

Call Scope:

The proposal should include, but are not limited to, the following:

1. Development and optimization of pyrite roasting, leaching, or other processing routes for efficient sulfur extraction.
2. Conversion of extracted sulfur into high-purity sulfuric acid suitable for industrial applications.
3. Process optimization to enhance sulfur recovery, energy efficiency, and overall economic viability.
4. Integration of environmental management measures, including emissions control, acid mist capture, and waste minimization.
5. Inclusion of a techno-economic analysis and/or feasibility study
6. Validation of developed technologies up to Technology Readiness Level (TRL) 3, through laboratory scale demonstrations.

Expected outputs should include validated laboratory scale pyrite-to-sulfuric-acid technology (TRL 3), demonstrated product quality meeting industrial specifications, optimized process parameters, environmental impact assessments, techno-economic analysis or feasibility study, intellectual property outputs (where applicable), comprehensive technical documentation, and trained researchers and technical personnel.

Budget and Duration:

The maximum budget allocated for this research priority is Php 10,000,000.00, with a project duration of two (2) years, covering Calendar Years (CY) 2027–2028.

Research Priority: 3. Development of technologies utilizing lahar/volcanic ash as a sustainable source of silica for wafer and glass manufacturing

Call Rationale

Silica (SiO_2) is a critical industrial mineral used in glass, ceramics, silicon wafers, electronics, and other advanced materials. The Philippines, as a volcanically active country, has abundant deposits of lahar and volcanic ash, which are naturally rich in silica. These deposits are often

underutilized, with most industrial-grade silica being imported from overseas, limiting domestic value addition and industrial competitiveness.

Developing technologies to extract high-purity silica from lahar and volcanic ash can convert abundant volcanic materials into value-added products for the glass, electronics, and semiconductor industries. Utilizing these resources locally reduces dependence on imported silica, promotes circular economy practices by valorizing volcanic deposits, and supports sustainable industrial development. Advanced processing of lahar-derived silica also opens opportunities for high-tech applications, including wafer fabrication for semiconductors, specialty glass production, and silica-based functional materials, thereby enhancing the competitiveness of Philippine manufacturing in global high-value markets.

In response to these opportunities, and following consultations with stakeholders from mining, materials science, and glass and semiconductor manufacturing sectors, the Department of Science and Technology–Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD) has identified the development of technologies for producing industrial-grade silica from lahar/volcanic ash as a priority research area under this Call. Strengthening domestic capabilities in this area will support sustainable industrial growth, reduce import dependence, enhance local value addition, and position the Philippines as a competitive supplier of silica for high-value applications.

Call Objective

To develop technically viable, economically feasible, and environmentally responsible technologies for producing high-purity silica from lahar/volcanic ash, suitable for glass manufacturing, semiconductor wafer production, and other industrial applications, thereby promoting sustainable mineral utilization and local value addition.

Call Scope

The proposal should include, but are not limited to, the following:

1. Development of beneficiation, purification, and processing technologies for extracting high-purity silica from lahar and volcanic ash.
2. Optimization of chemical and thermal processes to produce silica suitable for glass, wafer, or specialty industrial applications.
3. Evaluation of material properties and suitability for industrial standards, including purity, particle size, and crystallinity.
4. Environmental impact assessment, including mitigation of dust, particulate emissions, and waste by-products.
5. Inclusion of a techno-economic analysis and/or feasibility study
6. Validation of developed technologies up to Technology Readiness Level (TRL) 3, through laboratory scale demonstrations.

Expected outputs may include validated laboratory scale silica production technology (TRL 3), demonstration of silica meeting industrial specifications, optimized processing parameters, environmental impact assessment, techno-economic feasibility study, intellectual property outputs (if applicable), comprehensive technical documentation, and trained researchers and technical personnel.

Budget and Duration:

The maximum budget allocated for this research priority is Php 10,000,000.00, with a project duration of two (2) years, covering Calendar Years (CY) 2027–2028.

PROGRAM AREA: CRITICAL MINERALS FOR EMERGING TECHNOLOGY APPLICATION PROGRAM

Research Priority: 1. Development of Innovative Methodologies and Guidelines for Offshore Mineral Reserve Assessment, Exploration, and Extraction

Call Rationale

The Philippines is an archipelagic nation with an extensive exclusive economic zone (EEZ) and vast offshore areas that remain largely underexplored for mineral resources, despite increasing domestic and global demand for metals critical to infrastructure, clean energy, and advanced manufacturing. As onshore mineral resources face declining grades, land-use conflicts, environmental constraints, and social acceptability issues, offshore mineral resources such as marine placer deposits, seabed massive sulfides, and offshore aggregates represent a strategic but underdeveloped resource base.

However, the assessment, exploration, and extraction of offshore mineral resources pose distinct technical, environmental, and regulatory challenges that cannot be adequately addressed using conventional onshore mining methodologies. These include complex seabed geologies, dynamic oceanographic conditions, limited baseline environmental data, and heightened risks to sensitive marine ecosystems and coastal livelihoods. The absence of locally adapted, science-based methodologies and clear operational guidelines creates uncertainty for regulators, researchers, and industry, constraining responsible investment and effective governance.

Developing innovative, integrated methodologies combining geophysical and geochemical surveying, marine robotics, remote sensing, and data-driven resource modeling together with comprehensive national guidelines for offshore mineral reserve assessment, exploration, and extraction is therefore essential. Such frameworks will enable accurate resource quantification, risk-informed decision-making, environmental protection, and regulatory clarity, while ensuring alignment with international best practices and the Philippines' commitments to sustainable development, marine conservation, and climate resilience.

Establishing these methodologies and guidelines will support responsible offshore mineral development, strengthen national mineral security, reduce reliance on imported raw materials, and position the Philippines to strategically and sustainably harness offshore mineral resources as part of a future-ready mining and minerals policy.

Call Objective

To develop innovative methodologies and guidelines for offshore mineral reserve assessment, exploration, and extraction.

Call Scope

The proposal should include, but are not limited to, the following:

1. Development of integrated offshore mineral assessment and exploration methodologies, including marine geophysical and geochemical surveying, seabed sampling, and resource modeling, to accurately identify and quantify offshore mineral reserves within the Philippine maritime zones in accordance with UNCLOS.
2. Optimization of offshore exploration and extraction approaches, including the use of remote and autonomous marine technologies, to improve operational efficiency, safety, and data reliability under varying seabed and oceanographic conditions.
3. Evaluation of geological, geotechnical, and environmental parameters relevant to offshore mineral development, including deposit characteristics, seabed stability, sediment dynamics, and baseline marine environmental conditions.
4. Assessment of environmental and socio-economic impacts, including potential effects on marine ecosystems, fisheries, coastal communities, and cumulative impacts, together with the development of mitigation and monitoring strategies consistent with ecosystem-based and precautionary approaches.
5. Formulation and validation of technical and regulatory guidelines for offshore mineral reserve assessment, exploration, and extraction, aligned with existing draft offshore mining frameworks, UNCLOS obligations, and national regulatory requirements.
6. Validation of developed methodologies and guidelines up to Technology Readiness Level (TRL) 3–4, through laboratory-scale studies, numerical modeling, and controlled field or pilot demonstrations using representative offshore datasets.

Expected outputs include validated offshore mineral assessment, exploration, and extraction methodologies up to TRL 3–4; quantified offshore mineral resource estimates; and science-based technical and regulatory guidelines aligned with existing draft offshore mining frameworks, UNCLOS, and national regulations. Additional outputs include baseline environmental and socio-economic impact assessments, a techno-economic feasibility analysis, comprehensive technical documentation, potential intellectual property outputs, and trained researchers and technical personnel.

Budget and Duration

The maximum budget allotted for the above research is Php 40,000,000.00 with a duration of two (2) years covering Calendar Years (CY) 2027–2028.

Research Priority: 2. Development of advanced metallurgical processes for the extraction and recovery of high-value metals from mineral ores, tailings, wastes, and novel or unconventional sources for high tech emerging technology applications

Rapid growth in high-tech and emerging technologies is driving strong demand for high-value and critical metals, while traditional primary mineral sources are increasingly constrained by declining ore grades, environmental impacts, and social acceptability. At the same time, significant quantities of valuable metals remain locked in low-grade ores, mine tailings, industrial wastes, and secondary materials, including metal scrap from wrecked ships and other unconventional sources.

The development of advanced metallurgical processes to efficiently extract and recover these metals is therefore essential to enhance resource efficiency, reduce environmental liabilities, and strengthen supply chain security. Such innovations enable the production of industrial-grade metals for emerging technology applications, support circular economy and sustainable mining objectives, and reduce dependence on imported raw materials

2.1 Recovery of rare earth elements (REEs) for permanent magnets used in wind turbines and electric vehicles

Call Rationale

The demand for clean energy technologies is rising rapidly, with rare earth elements (REEs) playing a crucial role as key materials that enable this transition. REEs are essential for a wide range of high-value applications, yet global upstream supply remains highly vulnerable to disruption due to heavy dependence on China for both mining and processing, alongside limited capacity in other regions. As a result, countries are competing to secure reliable access to REEs, with projected demand expected to exceed supply and exert upward pressure on prices.

In the Philippines, wind turbines play an important role in advancing the country's clean energy transition by supporting energy security, climate resilience, and sustainable development. As an archipelagic nation highly vulnerable to climate change and heavily dependent on imported fossil fuels, the Philippines benefits from wind energy as a domestic, renewable, and low-carbon power source. The country has significant wind resources, particularly in coastal areas, mountain ridges, and northern and central regions, which can be harnessed to diversify the energy mix and reduce greenhouse gas emissions. Expanding wind power generation helps lower electricity costs in the long term, reduces exposure to volatile fuel prices, and supports national renewable energy targets under the Philippine Energy Plan and climate commitments. Moreover, the deployment of wind turbines contributes to rural development, job creation, and improved grid stability when combined with other renewable sources, making wind energy a strategic component of the Philippines' transition toward a cleaner and more resilient energy system.

Electric vehicles (EVs) play a vital role in the clean energy transition by reducing dependence on fossil fuels and significantly lowering greenhouse gas emissions from the transport sector, which is one of the largest contributors to air pollution and carbon emissions. By replacing internal combustion engine vehicles with EVs powered by electricity, especially when coupled with renewable energy sources, overall energy efficiency is improved, and emissions are reduced across the vehicle lifecycle. EVs also support energy system flexibility through smart charging and potential vehicle-to-grid applications, helping integrate variable renewable energy such as wind and solar. As EV adoption expands, it contributes to cleaner air, reduced fuel import dependence, and the development of sustainable, low-carbon transport systems essential for achieving long-term climate and energy goals. There has been a dramatic increase in global demand for electric vehicles, with EV sales growing rapidly year-over-year. In the Philippines, EV demand has been rising sharply from a relatively low base.

Call Objective

To develop innovative, technically viable, economically feasible, and environmentally responsible metallurgical processes to extract and recover industrial-grade rare earth elements (REEs) for permanent magnets used in wind turbines and electric vehicles.

Call Scope:

The proposal should include, but are not limited to, the following:

1. Development of beneficiation, purification, and processing technologies for extracting and recovery of industrial-grade rare earth elements (REEs) for permanent magnets used in wind turbines and electric vehicles.
2. Optimization of metallurgical processes to produce REEs suitable for wind turbines and electric vehicles for industrial applications.
3. Evaluation of material properties and suitability for industrial standards, including purity, particle size, and crystallinity.
4. Environmental impact assessment, including mitigation of contaminants, particulate emissions, and waste by-products.
5. Inclusion of a techno-economic analysis and/or feasibility study
6. Validation of developed technologies up to Technology Readiness Level (TRL) 3, through laboratory scale demonstrations.

Expected outputs should include validated laboratory to pilot-scale REE production technology (TRL 3), demonstration of REE recovery meeting industrial specifications, optimized processing parameters, environmental impact assessment, techno-economic feasibility study, intellectual property outputs (if applicable), comprehensive technical documentation, and trained researchers and technical personnel.

Budget and Duration:

The maximum budget allocated for this research priority is Php 20,000,000.00, with a project duration of two (2) years, covering Calendar Years (CY) 2027–2028.

2.2 Recovery of copper, zinc, lead, silver, and gold from volcanic deposits (e.g., lava, lahar and ash deposits).

Call Rationale

Copper, zinc, lead, silver, and gold are vital to the Philippines for industrial, technological, and clean energy development. Copper supports electrification and renewable energy infrastructure, zinc and lead are key for batteries and industrial applications, silver is critical for electronics and photovoltaics, and gold serves both high-tech uses and economic value. Recovering these metals domestically reduces import dependence, strengthens industrial capacity, and maximizes the country's mineral resources.

The recovery of copper, zinc, lead, silver, and gold from volcanic deposits, such as lava flows, lahar, and ash, is strategically important for the Philippines due to the country's location which hosts extensive volcanic terrains rich in metallic elements. in In the Philippines there are vast unutilized lava, lahar, and ash deposits, particularly in volcanic regions. Many of these deposits are remnants of past eruptions and lahars that were never mined because conventional operations focused on higher-grade primary ores. While traditional mining has focused on high-grade veins and porphyry deposits, significant quantities of metals remain dispersed in secondary volcanic materials that are often overlooked or treated as waste. These metals are critical for industrial and technological applications, including electrification, renewable energy systems, battery technologies, electronics, and high-value manufacturing.

Advanced metallurgical processes, such as hydrometallurgy, selective flotation, and bioleaching, now make it feasible to extract metals from these complex matrices, producing industrial-grade materials suitable for downstream use. Recovering metals from lava, lahar, and ash not only maximizes resource utilization and reduces reliance on imported strategic metals but also supports sustainable mining practices, minimizes environmental impact, and strengthens the domestic mineral value chain, positioning the Philippines as a key player in clean energy and high-tech industries.

Call Objective:

To develop innovative technically viable, economically feasible, and environmentally responsible metallurgical processes to extract and recover industrial-grade copper, zinc, lead, silver, and gold from volcanic deposits (e.g., lava, lahar and ash deposits).

Call Scope:

Proposed projects may include, but are not limited to, the following:

1. Development of beneficiation, purification, and processing technologies for extracting and recovery of industrial-grade copper, zinc, lead, silver, and gold from volcanic deposits (e.g., lava, lahar and ash deposits).
2. Optimization of metallurgical processes to recover industrial-grade copper, zinc, lead, silver, and gold from volcanic deposits (e.g., lava, lahar and ash deposits).
3. Evaluation of material properties and suitability for industrial standards, including purity, particle size, and crystallinity.
4. Environmental impact assessment, including mitigation of contaminants, particulate emissions, and waste by-products.
5. Inclusion of a techno-economic analysis and/or feasibility study
6. Validation of developed technologies up to Technology Readiness Level (TRL) 3, through laboratory scale demonstrations.

Expected outputs may include validated laboratory scale recovery of industrial-grade copper, zinc, lead, silver, and gold from volcanic deposits (e.g., lava, lahar and ash deposits) technology (TRL 3), demonstration of the above metal recovery meeting industrial specifications, optimized processing parameters, environmental impact assessment, techno-economic feasibility study, intellectual property outputs (if applicable), comprehensive technical documentation, and trained researchers and technical personnel.

Budget and Duration:

The maximum budget allocated for this research priority is Php 20,000,000.00, with a project duration of two (2) years, covering Calendar Years (CY) 2027–2028.

2.3 Recovery of lithium and other metals from geothermal brines.

Call Rationale:

The Philippines is home to several significant geothermal sites, making it the third largest producer of geothermal energy in the world, with major geothermal power plants located across Luzon, Visayas, and Mindanao. These systems circulate deep, metal-bearing fluids through

volcanic and magmatic rocks, creating brines that may contain economically recoverable concentrations of lithium and other strategic elements.

The need for lithium is driven by its central role in energy transition and modern technologies. Lithium is a critical component of lithium-ion batteries, which power electric vehicles (EVs), grid-scale energy storage systems, and portable electronics, making it essential for reducing greenhouse gas emissions and supporting renewable energy integration. Other metals, include rare earth elements (REEs) are also critical to the clean energy transition.

The need to explore geothermal brines arises from the growing demand for lithium, rare earth elements (REEs), and other critical metals for clean energy, electric vehicles, energy storage, and advanced technologies. Geothermal brines represent a domestic, renewable, and low-carbon source of these metals that are often present as by-products in the high-temperature fluids circulating in volcanic and magmatic systems. Recovering metals from brines allows the Philippines to diversify supply sources, reduce reliance on imported raw materials, and maximize the value of existing geothermal resources without additional mining impacts.

Call Objective:

To develop innovative technically viable, economically feasible, and environmentally responsible metallurgical processes to extract and recover industrial-grade lithium and other metals (e.g., rare earth elements) from geothermal brines.

Call Scope

The proposal should include, but are not limited to, the following:

1. Development of beneficiation, purification, and processing technologies for extracting and recovery of industrial-grade lithium and other metals from geothermal brines.
2. Optimization of metallurgical processes to produce industrial-grade lithium and other metals from geothermal brines.
3. Evaluation of material properties and suitability for industrial standards, including purity, particle size, and crystallinity.
4. Environmental impact assessment, including mitigation of contaminants, particulate emissions, and waste by-products.
5. Inclusion of a techno-economic analysis and/or feasibility study
6. Validation of developed technologies up to Technology Readiness Level (TRL) 3 through laboratory scale demonstrations.

Expected outputs should include validated laboratory scale production of industrial-grade lithium and other metals from geothermal brines with technology (TRL 3), demonstration of the above metal recovery meeting industrial specifications, optimized processing parameters, environmental impact assessment, techno-economic feasibility study, intellectual property outputs (if applicable), comprehensive technical documentation, and trained researchers and technical personnel.

Budget and Duration:

The maximum budget allocated for this research priority is Php 20,000,000.00, with a project duration of two (2) years, covering Calendar Years (CY) 2027–2028.

Research Priority: 3. Development of technologies enabling the utilization of natural hydrogen for low-carbon and sustainable steelmaking

Call Rationale:

The need for low-carbon and sustainable steelmaking arises from the steel industry's significant contribution to global greenhouse gas emissions, with traditional production methods relying heavily on coal and coke as reducing agents. As demand for steel grows to support infrastructure, transportation, and clean energy technologies, reducing the carbon footprint of steel production has become essential to meet climate targets, environmental regulations, and sustainability commitments.

Transitioning to low-carbon technologies would allow the Philippine steel industry to modernize production, reduce reliance on imported low-carbon steel, improve energy efficiency, and create a competitive edge in a global market increasingly focused on environmentally responsible steel products.

Using natural hydrogen lies in its potential to serve as a clean, zero-carbon reducing agent in industrial processes, particularly in steelmaking and other metallurgical applications. Unlike fossil fuels, natural hydrogen produces water rather than CO_2 when oxidized, offering a pathway to drastically reduce greenhouse gas emissions. It is also a domestic, naturally occurring resource in certain geological formations, which can complement renewable energy initiatives and reduce dependence on imported hydrogen or fossil fuels.

Utilizing natural hydrogen leverages an underexplored energy and metallurgical resource, enabling the development of low-carbon, sustainable industrial processes, enhancing national energy security, and fostering technological innovation in clean energy and advanced manufacturing sectors. For the Philippines, tapping natural hydrogen can support a transition to sustainable steelmaking and other high-temperature industrial applications, contributing to both economic competitiveness and climate goals.

Call Objective:

To develop innovative, technically viable, economically feasible, and environmentally responsible technologies for the utilization of natural hydrogen for low-carbon and sustainable steelmaking.

Call Scope:

The proposal should include, but are not limited to, the following:

1. Development of low-carbon and sustainable steelmaking with the application of natural hydrogen.
2. Optimization of steelmaking processes using natural hydrogen to produce industrial-grade steel.
3. Evaluation of material properties and suitability for industrial standards, raw material quality, process control, chemical composition, mechanical performance, dimensional tolerances, environmental compliance, occupational safety requirements.

4. Environmental impact assessment, including mitigation of contaminants, particulate emissions, and waste by-products.
5. Inclusion of a techno-economic analysis and/or feasibility study
6. Validation of developed technologies up to Technology Readiness Level (TRL) 3, through laboratory scale demonstrations.

Expected outputs should include validated laboratory scale steelmaking production technology (TRL 3), demonstration of steelmaking using natural hydrogen meeting industrial specifications, optimized processing parameters, environmental impact assessment, techno-economic feasibility study, intellectual property outputs (if applicable), comprehensive technical documentation, and trained researchers and technical personnel.

Budget and Duration

The maximum budget allocated for this research priority is Php 20,000,000.00, with a project duration of two (2) years, covering Calendar Years (CY) 2027–2028.

Research Priority: 4. Development of technology to recover vanadium from slags and mill scales

Call Rationale:

Vanadium is a strategically important metal widely used in the production of high-strength steels, specialty alloys, and chemical catalysts, with increasing relevance in energy storage and other emerging technologies. Its growing industrial demand and limited supply from primary sources highlight the need to develop secure and sustainable sources of vanadium to support industrial and technological development.

Vanadium commonly occurs in association with iron- and titanium-bearing mineral systems and is typically a by-product during ironmaking and steelmaking operations. During these processes, a significant portion of vanadium is transferred into secondary materials such as blast furnace slags, steelmaking slags, and mill scales. Despite containing potentially recoverable vanadium, these materials are often stockpiled or disposed of, resulting in resource inefficiency and additional environmental management challenges.

The Philippines is endowed with substantial iron and magnetite resources; however, limited downstream processing has constrained domestic value-adding opportunities. Slags and mill scales generated from mineral processing and metallurgical activities represent an underutilized secondary resource for vanadium. Developing technologies for the extraction, recovery, and refinement of vanadium to industrial-grade standards provides an opportunity to improve resource efficiency, promote waste valorization, and support circular economy practices without the need for additional primary mining.

In response to these challenges and opportunities, and in consultation with relevant stakeholders, the Department of Science and Technology–Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD) identifies the development of technologies for the recovery of vanadium from slags and mill scales as a priority research area under this Call. This initiative seeks to promote sustainable mineral development, enhance the availability of critical materials, and support the growth of downstream and emerging industries,

while also assessing the potential recovery of vanadium from wastes and slags in accordance with circular economy principles.

Call Objective:

To develop advanced, high-recovery, and environmentally responsible processing technologies for the extraction, recovery, and refinement of vanadium from slags and mill scales to industrial grade standards, ensuring resource efficiency, supporting sustainable mineral value-adding, and contributing to the development of downstream and emerging industries.

Call Scope:

The proposal should focus on the following:

1. Characterization of vanadium-bearing secondary materials, including mineralogical and chemical analyses.

2. Advanced extraction and recovery techniques for vanadium from metallurgical slags and mill scales.

3. Refinement and upgrading of recovered vanadium to industrial-grade standards.

4. Environmentally sound processing methods and waste management strategies.

5. Process optimization to improve vanadium recovery, efficiency, and sustainability.

6. Inclusion of a techno-economic analysis and/or feasibility study.

7. Validation of the developed technologies up to Technology Readiness Level (TRL) 3 through laboratory-scale testing.

Expected Outputs

The proposal should clearly identify measurable outputs, including but not limited to:

1. Recovery and characterization of vanadium refined to industry specifications.

2. Optimized process flow sheet and operating parameters for vanadium recovery.

3. Demonstrated improvement in vanadium recovery and processing efficiency from slags and mill scales.

4. Environmental impact assessment and corresponding mitigation strategies.

5. Cost–benefit analysis and/or techno-economic feasibility study.

6. Patent application, utility model, or other intellectual property outputs (where applicable).

7. Comprehensive technical report with industry-oriented recommendations.

8. Trained researchers and technical personnel with expertise in vanadium recovery technologies.

9. Laboratory-scale validation of the developed technologies up to TRL 3.

Budget and Duration:

The maximum budget allocated for this research priority is Php 10,000,000.00, with a project duration of two (2) years, covering Calendar Years (CY) 2027–2028.

PROGRAM AREA: TECHNOLOGIES IN SUPPORT TO ENVIRONMENTAL PROTECTION, CONSERVATION AND REHABILITATION OF MINED-OUT AREA

Research Priority: 1. Establishment of a circular value chain for small scale mining industry

Call Rationale

Small-scale mining plays a significant role in local economies but often operates with limited access to technology, resulting in low resource efficiency and the generation of unmanaged wastes and by-products. These inefficiencies limit the economic benefits that could otherwise be derived from mineral resources. The application of circular economy principles offers an opportunity to improve resource utilization, reduce environmental impacts, and create additional value streams within the small-scale mining sector.

This research priority addresses the need for technology-based solutions that enable the recovery, reuse, and recycling of materials across the small-scale mining value chain. Establishing a circular value chain can support environmental protection, improve productivity, and enhance livelihood opportunities in mining communities while promoting responsible and sustainable mining practices.

In consultation with the DOST-PCIEERD Mining and Minerals Stakeholders, the establishment of a circular value chain for the small-scale mining industry has been identified as a priority research and development area to promote sustainable growth, responsible resource management, and inclusive economic development.

Call Objective

To establish a circular value chain for the small-scale mining industry that maximizes resource efficiency, minimizes environmental impact, and enhances economic returns, while supporting the adoption of sustainable and socially responsible mining practices

Call Scope

The proposal under this research priority should include, but are not limited to the following:

Development of technologies and processes for waste reduction, recovery of valuable by-products, and recycling within small-scale mining operations.

1. Integration of circular economy principles into existing SSM practices, including beneficiation, processing, and logistics.
2. Assessment of environmental and social impacts, ensuring compliance with regulations and promoting safe, sustainable mining.

3. Development of business models and value chain frameworks that enhance profitability, market access, and community benefits.
4. Capacity-building and training programs for small-scale miners in circular economy practices and technology adoption.
5. Pilot implementation and demonstration of circular value chain practices in selected SSM sites.

Expected measurable outputs include: validated circular processing technologies and methods applicable to SSM, optimized workflows and operating protocols for resource efficiency and waste minimization, demonstrated improvement in recovery rates, profitability, and environmental performance, environmental and social impact assessments with mitigation strategies, business models or frameworks for sustainable small-scale mining operations, technical reports and recommendations for policy, industry, and community adoption and trained SSM operators, technical personnel, and community stakeholders.

Budget and Duration:

The maximum budget allocated for this research priority is Php 20,000,000.00, with a project duration of three (3) years, covering Calendar Years (CY) 2027–2029.

Research Priority: 2. Mine Waste Characterization and Valorization: Assessing Long-Term Feasibility for Carbon Storage, Phytomining in Mined-Out Areas, and Community-Integrated Waste Repurposing

Call Rationale:

Mine wastes and tailings generated from mining operations pose long-term environmental and safety risks if left unmanaged, particularly in abandoned and mined-out areas. However, these materials also present opportunities for environmental rehabilitation, climate change mitigation, and resource recovery when properly characterized and valorized. Emerging approaches such as carbon storage, phytomining, and nature-based solutions offer promising pathways to transform mine wastes into assets while supporting ecosystem restoration and community development.

Call Objective

The objective of this research priority is to support applied research and technology development on the characterization and valorization of mine wastes to enable their safe, sustainable, and beneficial use for environmental rehabilitation, carbon storage, and community-integrated applications.

Specifically, the call aims to:

1. Generate data and technologies that support long-term and environmentally sound utilization of mine wastes
2. Evaluation of the feasibility of mine wastes for carbon storage and sequestration, including mineral carbonation potential and long-term performance assessment;
3. Advance nature-based and community-centered approaches for the rehabilitation of mined-out areas.

Call Scope

Proposals under this research priority may include, but are not limited to:

1. Assessment of the feasibility and long-term performance of mine wastes for carbon sequestration and storage;
2. Development and evaluation of phytomining and other nature-based solutions for metal recovery and land rehabilitation;
3. Environmental risk assessment, monitoring, and validation of proposed valorization strategies

Budget and Duration:

The maximum budget allocated for this research priority is Php 10,000,000.00, with a project duration of two (2) years, covering Calendar Years (CY) 2027–2028.

Research Priority: 3. Development of technology to treat and utilize tailings for industrial applications

Call Rationale

Large volumes of mine tailings are generated throughout the life of mining operations and are often stored in tailings facilities, posing environmental, safety, and long-term management challenges. At the same time, tailings may contain valuable minerals and materials that can be recovered or converted into inputs for industrial applications. Advancing technologies that enable the treatment and utilization of tailings can significantly reduce environmental risks while improving resource efficiency and supporting industrial development.

This research priority responds to the need for innovative, scalable, and industry-ready technologies that transform mine tailings into value-added products, in line with sustainable mining and circular economy principles.

Call Objective:

The objective of this research priority is to support the development, optimization, and validation of technologies that enable the safe treatment and industrial utilization of mine tailings, thereby reducing waste, minimizing environmental impacts, and creating new economic opportunities.

Specifically, the call aims to:

1. Develop technically viable and environmentally compliant tailings treatment technologies; and
2. Demonstrate the potential of treated tailings for use in industrial and commercial applications.

Call Scope:

Proposals under this research priority may include, but are not limited to:

- Development and optimization of novel physical, chemical, or biological processes to treat, stabilize, or detoxify mine tailings using locally available materials
- Conversion of tailings into industrial raw materials, or other value-added products;
- Inclusion of a techno-economic analysis and/or feasibility study

Budget and Duration:

The maximum budget allocated for this research priority is Php 5,000,000.00, with a project duration of two (2) years, covering Calendar Years (CY) 2027–2028.

Specific Features Sought in this Call

1. Proposals must align with the indicated Call Scope and be submitted by qualified and competent researchers from HEIs, RDIs, or other government R&D institutes. Submissions from private entities, consultants, or similar parties will be automatically disapproved.
2. All project staff must have relevant expertise to ensure meaningful technical contributions.
3. If a consultant is involved, a draft Terms of Reference (TOR) must be provided.
4. Proposals should demonstrate clear social and economic benefits. Must address at least one of the seventeen (17) Sustainable Development Goals (SDGs).
5. Proposals must systematically incorporate GAD principles in project design, implementation, and anticipated outcomes. The study should acknowledge that technological development and innovation may have differentiated impacts on women, men, and gender-diverse groups, particularly within the target industry and locality.
6. Proposed research should have a minimum TRL of 3 or 4. Should demonstrate potential for transferability to industry and the local context.
7. All proposals must include at least one Commitment Letter/Letter of Cooperation from: An industry partner engaged in related business, or A concerned agency mandated to adopt/use the research outputs. Failure to submit will result in disapproval or non-consideration.
8. The LIB must include 20% counterpart funding from the implementing agency and private industry partner. Only eligible and allowable costs (e.g., utilities) may be used for counterpart funding or in-kind contribution, as determined by DOST-PCIEERD.
9. For proposals including equipment, provide unit details, specifications (accessories not allowed), and quotations.
10. For any LIB items exceeding Php 100,000.00, provide a detailed cost breakdown.
11. Foreign travel presentation of project outputs in conferences is expected during the last year of the project. For foreign training, proponents are encouraged to tap the PCIEERD RIETOOL Program.
12. Proponents with unliquidated completed projects must secure clearance from the funding agency confirming fulfillment of all obligations.
13. Proponents must have read, understood, and agreed to comply with the Guidelines for the Grants-in-Aid Program of the DOST and its Agencies.

Metals and Engineering Sector

Metals and Engineering (M&E) is one of the priority sectors of the Philippine Council for Industry, Energy, and Emerging Technology Research and Development (PCIEERD) that supports different industries (e.g., manufacturing, agriculture, automotive, aerospace, etc.) through local fabrication of appropriate machineries/equipment and devices, upgrading/strengthening of S&T services through facility establishment, and the development of diverse metalworking technologies through R&D.

The M&E sector was originally composed of four roadmaps, namely: (1) Machining and Fabrication, (2) Metal Casting, (3) Tool and Die, and (4) Surface Engineering. However, despite the priority areas identified through the roadmapping sessions conducted in 2020, few to no proposals were received, particularly under the Tool and Die and Surface Engineering roadmaps. Therefore, the sector decided to develop new and revised roadmaps that will cover most of the technical needs of the industry, subject to validation by stakeholders from the public and private sectors, academe, and industry players through consultations, interviews, Focus Group Discussions (FGDs), and roadmapping sessions.

Since the sector is currently developing its new roadmaps, for this Call, the focus and priority will be on Machining and Fabrication.

In 2024 and 2025, the M&E sector, together with various stakeholders from the local metals industry, conducted Focus Group Discussions (FGDs) and industry immersion activities to start the systematic and validation of the needs, challenges, and priority concerns of the local metals industry across the identified priority areas. The insights that will be generated from these engagements will serve as the basis for understanding existing gaps in capabilities, technologies, and processes, and for formulating practical, industry-responsive solutions to address these gaps and enhance the overall competitiveness of the local metals sector.

Call Objective

The objective of this Call is to enjoin qualified local institutions, engineers, scientists, and individuals to develop and implement practical and innovative solutions that address the challenges and constraints in local product manufacturing, machine fabrication, and production processes, with the aim of improving the competitiveness and productivity of the metals industry.

Call Rationale

Machining and Fabrication

Based on the FGDs conducted, most of the metal manufacturers and fabricators are still dwelling on manual/traditional machine development. In terms of Industrial Revolution level, majority of the metals industry are still within 1.0 to 2.5 and adopting to latest technology trends remains a bottleneck for them due to the following concerns: (1) instead of equipment manufacturing, the industry is still doing single projects fabrication (customized) (2) high importation of equipment resulting for the metals industry to focus on repair and maintenance of imported equipment instead of developing/fabricating new ones, (3) Local die and mold companies have been resorting as traders instead of manufacturers because of lack of market/consistent demand, (4) high cost of labor and operations and (5) lack of S&T facility for metal testing (e.g., mechanical test, chemical analysis, physical test, etc.) for specific area in Visayas and in Mindanao.

Despite the mentioned problems, the metals industry remains steadfast in their craft and still prioritizing the development of equipment for food production/manufacturing (e.g., canneries) and agro-processing equipment.

To continuously support the metals industry, below are the main themes for this Call:

1. Locally Design and Development of innovative, cost-effective, and appropriate Metal Equipment, Machine Parts and Engineered Products for various industries (e.g., food, agro, environment, creative)
2. Establishment/Development of Primary/Secondary Traceability Standards in Support to Metals Industry
3. S&T services for metals industry

The first theme will focus on designing, development, fabrication, automation of machine or development of specialized parts to produce specific designs of equipment/machinery or devices tailored to the demands of specified industry (e.g., food sector, etc). The mechanical processes may include but not limited to fabrication metal cutting, machining, stamping, welding, assembling.

Also, a database of fabricators nationwide should also be established for reference of the local manufacturers/fabricators in terms of raw materials, services offered and possible partnership and collaborations among fabricators to deliver their products.

The second theme will focus on metrology, which supports the entire metals industry through the provision of proper and accurate calibration of tools and measuring instruments used in manufacturing processes. In recent years, the sector has supported metrology-related projects implemented by the Industrial Technology Development Institute (ITDI) of the Department of Science and Technology (DOST), which led to the establishment of the National Metrology Laboratory (NML). The NML is currently pursuing research and development studies aimed at establishing facilities aligned with the International System of Units (SI) to provide local calibration services and achieve self-sufficiency in calibration across various fields (e.g.,mass, temperature, force, and others).

Below are the specific topics sought in this call to address the identified gaps:

Call Scope

1. FASTPhils: Fabricators Assessment and Scoping in the Philippines

2. Establishment/Development of Primary/Secondary Traceability Standards in Support to Metals Industry

3. Innovative local Design and Development of cost-effective, and appropriate Equipment (mechanized/automated), Machine Parts and Engineered Products for the following applications:
   a. Food Industry
      - *Food processing industry (e.g. coconut, coffee, cacao, etc.)*
      - *Mobile food service technologies*
   b. Downstream machinery for Agro-industry products
   c. Creative industry (*e.g. equipment for furniture, weaving, blacksmithing*)
   d. Environment Industry (*e.g. equipment for waste processing/elimination*)

e. Human Security (*e.g. firearms quality control system equipment, localization of equipment or machines to support the Philippines' Self-Reliant Defense Posture Program (SRDP*)

4. S&T services (i.e., metal testing services) for metals industry in Visayas and in Mindanao.

PCIEERD will fund/endorse maximum of 14 projects not to exceed Php235M covering all projects with a maximum duration of three (3) years for each project.

Specific Features Sought in this Call

The proposal should be well written and must contain the following information in the submitted documents:

1. Technology roadmap (if available).
2. Thorough Review of Literature to clearly present the related research/activities, baseline studies which have been conducted (including patent search, showing no duplication of the proposed technology), as well as the state-of-the-art technology, existing technologies available in the market or current information from which the proposal will take off.
3. Sustainability plan for the proposed equipment/technology to be developed (e.g., maintenance of the developed equipment or technology).
4. Commitment letter/s secured from the identified beneficiary/end-user of the proposed technology.
5. Letter of intent from the identified potential licensee/fabricators/mass producers for proposals that entails fabrication of equipment.
6. For proposals with development of equipment, clearly specify (possibly quantify) these **NSDB-ME** in the proposal: Need, Solution, Differentiation (show this in a matrix), Benefits, Maintenance and repair and service commitment and economic viability.
7. Track record of the proponent related to his/her proposal such as journals published, patents/UMs approved, etc.
8. Include research and development or fabrications laboratory capabilities of the State Universities/Colleges or Higher Education Institutions (HEIs) in terms of facilities and available equipment.
9. List of equipment to be purchased to undertake project activities including its quotations from the supplier.
10. Under equipment development ensure to follow the table below.

Parameter	Existing Equipment/Process/ Technique in the Market	Proposed Fabricated Equipment/ Process/ Technique	Remarks
Process/Techniques			
Material			
Speed/performance			
Capacity			
Dimension/design			

Quality (e.g., produced product/equipment)			
Manpower Needed			
Cost			
Others (Pls specify other parameters applicable/suitable to the propose equipment)			

11. For project leaders with on-going projects, updated reports for their respective projects should be submitted (i.e. technical progress and terminal and audited financial report). For completed projects, clearance from the funding agency from any obligations under the project.

Environment

Theme: Innovative Green Technologies for Sustainable Environment and Circular Economy

Overview

The 2026 Call for Proposals under the Environment Sector focuses on the three sub-sectors, namely: (1) water quality/wastewater treatment and management, (2) air quality, and (3) solid waste management. These topics would like to address pressing national problems by providing solutions through programs for the prevention and control of water pollution, air pollution and innovative solutions to plastic wastes, respectively.

In addition, the three (3) roadmaps of the Environment sector of PCIEERD namely, S&T Water Environment Roadmap, S&T Clean Air Roadmap and Sustainable S&T Solid Waste Management Roadmap which were developed with collaborative efforts among National Government Agencies (NGAs), academe, non-government organization and other stakeholders, will serve as basis for the development of new programs and projects to be included in the Call. The updated roadmap (2022-2040) sets the direction of each sub-sector which is also aligned with the different national programs such as the DOST's Harmonized National Research and Development Agenda (HNRDA 2017-2022) and the Philippine Development Plan (PDP) to complement the SDG 2030 Agenda and Ambisyon Natin 2040.

Additional Call Document Requirements

- Letter of Commitment from an industry/government partner or end user. Specific involvement must be identified in the letter (e.g. investor in technology development, adopter of the R&D output) as well as their counterpart support in project implementation (e.g. funding, or in-kind donation – equipment, personnel technical support, provisions for service facility)

- If their counterpart is the use of the facility, estimated amount should be reflected in the LIB and the schedule on the use of the facility is shown in the workplan
- If their counterpart is the personnel technical support, the number and the estimated salary for their period of participation is shown in the LIB and in the workplan
- If they plan to adopt the technology, initial plan on the adoption should be reflected in the detailed sustainability plan after project completion
- Detailed Sustainability Plan after the Project Completion
- Technology Roadmap. A clear roadmap of project activities and outputs
- Data on how the project can contribute to the improvement of environmental conditions by including any possible environmental impact from the proposal
- Incorporate the socio-cultural, political, health and economic implications of managing pollution, impact to the industry and its target outcome
- For project leaders with on-going projects, updated reports for their respective projects should be submitted (i.e. technical progress and terminal and audited financial report). For completed projects, clearance from the funding agency from any obligations under the project.
- Research outputs must lead to S&T policy formulations and decision support systems for sustainability

Program 1: National Research and Development Program for the Prevention and Control of Water Pollution

Call Rationale

This sub-program is aligned to the Philippine Clean Water Act of 2004 (Republic Act No. 9275) that aims to protect the country's water bodies from pollution from land-based sources (industries and commercial establishments, agriculture and community/household activities). It provides a comprehensive and integrated strategy to prevent and minimize pollution through a multi-sectoral and participatory approach involving all the stakeholders. Under *Section 24* of the Philippine Clean Water Act, *Pollution Research and Development Programs,* it states that, the DENR in coordination with the Department of Science and Technology (DOST), other concerned agencies and academic research institutions, shall establish a *"National Research and Development Program for the Prevention and Control of Water Pollution."* As part of the said program, the DOST shall conduct and promote the coordination and acceleration of research, investigation, experiments, training, survey and studies relating to the causes, extent, prevention and control of pollution among concerned government agencies and research institutions.

Over the years, the Department of Science and Technology (DOST) has supported the implementation of this law through the R&D initiatives that have addressed challenges in water pollution such as treatment technologies/techniques for environmental compliance of different types of industries, resource recovery of nutrients, heavy metals, and endocrine disruptors in wastewater and waterbodies.

While previously supported projects contributed to the advancement of knowledge and development of technologies in water/wastewater pollution control, there are remaining gaps in compliance with the national effluent standards as well as detection of emerging pollutants in the wastewater and waterbodies.

In the recent Focus Group Discussion (FGD) conducted with different industry associations and government regulatory agencies, it was found out that due to the updated DENR Administrative

Order 2016-08 Water Quality Guidelines and General Effluent Standards, guideline values for nitrates and phosphates are higher which industries find it hard to comply. Thus, new treatment systems/technologies need to be developed to achieve the new DENR standards.

On the other hand, one of the emerging water pollutants that needs immediate intervention is microplastics. In the last five (5) years, several studies has proven that microplastics are already present in waterbodies in the country such as Lake Mainit in Mindanao (Arcadio, 2025), Metro Manila rivers (Tanchuling, 2020), and Laguna de Bay (Arcadio, 2022). Interventions should be implemented to control this emerging pollutant before it can negatively affect the human food chain and overall health of the people.

Furthermore, in the case of the cleaning industry specifically the laundry business, there are an estimated 25,000 – 28,000 laundry shops nationwide including unregistered ones. Small laundry shops cater to the general public with personal clothes, while industrial laundry serves hotels, restaurants/catering businesses, manufacturing and healthcare. Several challenges are needed to be addressed in this specific industry such as limited space and costly wastewater treatment system, high volume discharge of rinse water that affects the microbial community in the sewage treatment system, high water demand that competes with other uses and lesser cleaning efficiency of hard water, and the problems in managing high volume of used sachets of laundry soaps and fabric conditioners. This is another industry that may need R&D intervention for its wastewater management.

Lastly, key water bodies may also necessitate targeted research and development (R&D) interventions. Laguna Lake is the largest lake in the Philippines and 3rd largest lake in Southeast Asia with a surface area of 900 km^2. Its watershed area is approximately 2,920 km^2 with an average volume of 2.9 B m^3 Reference: https://llda.gov.ph. This waterbody has been an important resource by the surrounding localities with a region population of 17, 565, 318 (reference: PSA, 2020) and the country in general. Due to its multiple uses such as fisheries, navigation, temporary storage of floodwater, hydroelectric power generation, source of irrigation, domestic water supply, and recreation. Due to these mentioned uses, there are numerous threats to the lake such as untreated domestic sewage that leads to sediment and nutrient accumulation of the lake causing poor water quality, harmful algal blooms and fish kills. Flooding and saltwater intrusion are also growing concerns in the lake and its vicinity. Several initiatives have been done by the Laguna Lake Development Authority and other partners (https://llda.gov.ph.) However, more interventions are needed to address the constant pressure in the lake and its tributaries. There is a need to provide long-term and sustainable strategies to manage the lake.

Call Objectives

The main objective of this call is to give special emphasis to research and development of improved methods and development of innovative technologies, having industry-wide application for water quality management and pollution control. It is important to note that the program/project should be holistic in approach, closed loop technological interventions that are low-cost/cost effective and innovative, multi-disciplinary or transdisciplinary to foster collaborative learning and inclusive solutions development with all stakeholders.

Call Scope

The R&D initiatives should address/cover the following identified research areas:

1. Cost-effective and portable treatment for nitrate, phosphate, oil and grease and ammonia in accordance with DENR Administrative Order 2016-08 Water Quality Guidelines and General Effluent Standards
3. Development/ Application of scalable treatment and/or removal of heavy metals (HM) and other emerging pollutants in wastewater or waterbodies
4. Development of cost-effective microplastic filtration with treatment technologies for wastewater and sludge from industries and/or communities
5. Development of scalable, low-cost, high-efficiency wastewater treatment solutions for small enterprises /SMEs, including modular STPs for high-density areas and compact systems for condominiums.
6. Innovations in water recycling technologies, such as rinse water recovery systems and hybrid rainwater-recycling models
7. Development of cost-effective water softening technology
8. Development of cost-effective technologies for rehabilitation and conservation of Laguna Lake

PCIEERD will fund/endorse maximum of 8 projects not to exceed Php100M budget covering all projects. The maximum duration for each project is 3 years.

Program 2: National Research and Development Program for the Prevention and Control of Air Pollution

Call Rationale

Another national law that DOST supports is the Philippine Clean Air Act of 1999 (Republic Act No. 8749) that outlines the government's measures to reduce air pollution and incorporate environmental protection into its development plans. Under the 'Implementing Rules and Regulations for Philippine Clean Air Act, the Air Pollution Research and Development Program, Section 1 states that a "*National Research and Development Program for the Prevention and Control of Air Pollution*, the DENR through its bureau, in coordination with the Department of Science and Technology (DOST), other agencies, the private sector, the academe, NGOs and POs shall, establish a National Research and Development Program for the Prevention and Control of Air Pollution."

The Sustainable S&T Clean Air Roadmap (2022-2028) of DOST-PCIEERD aligns its goal to improve and maintain good air quality across the Philippines. The law establishes the National Air Quality Guideline Values for key pollutants, which serve as targets for cities and municipalities. Due to the high cost of internationally accepted monitoring equipment, locally manufactured sensors were developed in order to complement the limited air quality monitoring stations used by DENR. The next step is to develop technologies for the control and abatement of air pollutants.

On the other hand, climate change and global warming are also a global environmental issue that needs urgent attention. As an archipelagic country, the Philippines is one of the countries at greatest risk to climate-related hazards such as increased frequency and severity of storm surge, floods, landslides, and droughts, among others. These exacerbate risks to agriculture, energy, water, infrastructure, human health, and coastal ecosystems. As a signatory to the Paris agreement, there is a need to develop technologies to assess and mitigate greenhouse gas (GHG) emissions to avoid and mitigate the perceived threats to the country.

With these concerns on air pollution control and abatement as well as climate change mitigation solutions, the focus areas that need to be addressed are GHG capture & mitigation technologies, containment technologies to prevent diffusion of pollutants/ industrial gas leaks and cost-effective technologies for air pollution abatement and control.

One of the emerging threats in the environment and human health is microplastics and nanoplastics. Several interventions have been implemented for microplastics in water. However, very few are being developed for monitoring, control, and abatement for microplastics in ambient air. Studies in this area should be implemented in the country to have localized findings and interventions.

Call Objectives

The proposals to be submitted should be able to develop technologies that will support new interdisciplinary research and innovation that will tackle Sec. 15. Air Pollution Research and Development Program i.e., establish a National Research and Development Program for the prevention and control of air pollution. Proposals should give special emphasis to research and development of improved methods and development of innovative technologies having industry-wide application for the prevention and control of air pollution.

Call Scope

The R&D initiatives should address/cover the following identified research areas:

1. Development of GHG emission monitoring & assessment tools and protocols
2. Development of GHG capture & mitigation technologies
3. Establishment of locally developed emission factors and standards
5. Development of real-time spatio-temporal emission inventory, monitoring and ambient air quality forecasting
6. Development of monitoring and analysis tool for presence of air pollutants, microplastics and other gas leaks in ambient air with innovative containment technologies

Note: PCIEERD will fund/endorse maximum of 6 projects not to exceed Php100M budget covering all projects. The maximum duration for each project is 3 years.

Program 3: Innovative Solutions to Solid Waste Management
Call Rationale

From the 2023 Performance Audit report of the Commission of Audit (COA), solid waste generation in the Philippines is steadily increasing from 2017 to 2021 despite government programs to improve solid waste management. Several factors contribute to this scenario: inconsistent implementation of waste segregation and waste diversion, wherein the significant presence of mixed wastes was found in landfills and no sufficient waste facilities and landfills to service the LGUs and barangays nationwide., among others.

In the current DENR Solid Waste Management Division website, *the Philippines' estimated waste generation from 2015-2024 increased from 51,424 metric tons/day in 2015 to 61,700 metric tons/day in 2024 having NCR and Region4A both with the highest generation of more than 9,000*

metric tons/day. Facilities for waste infrastructure should be systematized and institutionalized to strengthen the waste management flow and improve the solid waste management of the LGUs.

A sustainable solution that can be explored by the country is an integrated solutions following Bio-Circular-Green Economy (BCG) model for solid waste reduction, prevention & control is another pathway that the country can explore to support a sustainable and circular economy.

In the publication by Jambeck et al, 2015 (reference: https://www.futureocean.org/ozeanwissen/topics/plastic_en.php) the Philippines together with China and Indonesia was tagged as the top three plastic polluters in the world. From a more recent study by Meijer et al 2021 (reference: https://www.science.org) it is estimated that 1 million MT of plastic waste enters the ocean every year and the Philippines was tagged as the leading contributor with an estimated 356,371 MT/year. The study's waste emission estimates were based on the relatively small land surface compared to the length of the coastline and high precipitation rates of the country. Local studies of our country on the actual status and dynamics of plastic wastes that reach the waterbodies (e.g. rivers and seas) should be conducted to validate these results, update the status of plastic waste generation nationwide and come up with a sustainable plan on plastic management.

Aside from policies to be strengthened, technologies to prevent and mitigate marine litter are necessary to combat plastic pollution. Thus, the need for R&D on innovative strategies and technologies for marine litter mitigation and management (e.g. AI/GIS for predictive analytics & real-time simulations, etc.). Further, other strategies that can address solid waste management issues with the integration of Circular Economy pathways are integrated solutions following BCG model, technologies for solid waste (non- metal wastes) prevention and control for ship recycling, and scalable technologies for solid waste recycling/reuse (i.e. single use plastics).

As a result of the consultation with the laundry industry, one of the growing concern is the high volume of accumulated plastic wastes from sachets, carboys and other wastes with laminates. Thus, a technology to address these types of plastic wastes with circular solutions should be developed to avoid or at least delay ending up in the landfills. Another growing industry is the shipping industry for both people and cargo. However, waste management is also a long time issue that affects both land and water due to improper waste management on board. In this case, there is a need to improve the waste management systems through smart tools or technologies for merchant vessels.

It is also worth noting to develop or improve decentralized waste processing technologies for rural and urban barangays or households. This is the smallest unit of the community where solid wastes accumulate, and proper solid waste management should start.

Call Objective

The objective of this call is to support inter-disciplinary research to understand the risks that solid waste pollution poses and provide technological interventions. Therefore, this call requires the proposals to address the key gaps and to incorporate the socio-cultural, political, health and economic implications of managing pollution while providing scientific data that will support and lead to formulations of policies.

Call Scope

The R&D initiatives may include the following potential study areas:

1. R&D on innovative strategies and technologies for marine litter mitigation and management (e.g. AI/GIS for predictive analytics & real-time simulations, etc.)
2. Integrated solutions following Bio-Circular-Green Economy (BCG) model for solid waste reduction, prevention & control
3. Development of Clean Technologies for solid waste prevention & control and materials recovery and utilization (non-metal) from ship recycling
4. Development of cost-effective technologies for managing and recycling sachets and carboys and other plastic waste (i.e. laminates) under circular economy model
5. Development of improved waste management systems and technologies for merchant vessels
6. Development of decentralized waste processing technologies for rural and urban barangays

PCIEERD will fund/endorse maximum of 8 projects not to exceed Php100M budget covering all projects. The maximum duration for each project is 3 years.

Creative Industry Sector

For 2026, the PCIEERD Creative Industry Sector shall accept proposals under the following priority programs:

1. Footwear Program
2. Furniture Applications Program

Call Rationale

In the 2025 Global Innovation Index (GII), the Philippines ranked 50th out of 139 countries, entering the top 50 and emerging as a consistent innovation performer in Southeast Asia, East Asia, and Oceania. The country ranks 16th in creative goods exports, 1st in high-tech exports, 4th in high-tech imports, and 20th in ICT services exports, reflecting a trade-driven economy integrated into global markets and focused on applied innovation (https://www.wipo.int/web-publications/global-innovation-index-2025/en/gii-2025-results.html).

The creative industry is a rapidly growing sector globally, contributing significantly to economic growth, cultural enrichment, and sustainable development. In the Philippines, this sector reflects the country's rich cultural heritage and abundant creative talents. According to the Philippine Statistics Authority, the creative economy grew by 8.7% in 2024, representing 7.3% of GDP and employing over 7.5 million workers (PSA, 2025).

Within the creative economy, Symbols, Images, and Related Activities accounted for the largest share at 33%, followed by Advertising, R&D, and other Artistic Services (21.4%) and Digital Interactive Goods and Services (20.6%), highlighting the economic significance of heritage, design, visual communication, and innovation-driven sectors (https://psa.gov.ph/system/files/technical-notes/ons-cleared_3-Technical-Notes-Creative-Mar22_ONS-signed-1.pdf).

These activities cover the manufacturing, rental, and trade of products in textiles, garments, footwear, furniture, jewelry, fashion accessories, and toys. The Philippines is therefore well-

positioned to strengthen innovation and competitiveness in subsectors such as footwear and furniture through targeted research and development. Advancing R&D in these areas will not only support market diversification and value addition.

Through this call, DOST-PCIEERD seeks to align its programs with the objectives of the Philippine Creative Industries Development Act (RA 11904), ensuring that research and innovation actively address sectoral challenges while generating tangible socio-economic benefits. This initiative represents a forward-looking strategy to reinforce the Philippines as a leading creative hub in Asia by 2030.

Call Objective

The Call aims to provide support to qualified S&T research proposals of programs and projects with innovation and R&D solutions to identified priority areas of the creative industries particularly on footwear and furniture. Specifically,

1. To increase research and innovation that are relevant to future innovation waves in the creative industries sector.
2. To spur collaboration across innovation stakeholders in the Creative Industries and encourage long-term R&D partnerships between academe, research and development agencies, creative enterprises, and other stakeholders.
3. To encourage development of homegrown technology and technological capabilities that are relevant to the sector.

***Specific Features Sought* for all Creative Sector Programs:**

1. The implementing agency and proponent should have a track record and established expertise on the proposed project.
2. For project leaders with ongoing projects, updated reports for their respective projects should be submitted (i.e. technical progress and terminal and audited financial report). For completed projects, clearance from the funding agency from any obligations under the project.
3. The proposal must include the following details:
    a. Detailed Review of Literature by including previous works and/or relevant studies where the proposal will take off, showing no duplication in proposal concept with local research conducted
    b. Information on potential socio-economic impact and marketability demonstrating the importance of the proposed technology to support a strong value proposition:
        - Impact Statement
        - Projected employment generation after the completion of the project. Identify the specific jobs to be involved in and estimate the number of personnel needed
        - Estimated increase in income/productivity
        - Current demand and potential market expansion
    c. Advantages of the proposed intervention and its target cost over the existing/commercially available/similar interventions
    d. Potential impacts to the identified industry partner or partner institution

e. Data on how the project can contribute to the improvement of environmental conditions by including any possible environmental impact from the proposal and waste management plan
f. It has potential for commercialization. Commitment letter/s from identified cooperating/industry partner/s to support the marketability of the proposed product to demonstrate interest are required. Specific involvement must be identified in the letter (e.g. investor in technology development, adopter of the R&D output) as well as their counterpart support in project implementation (e.g. funding, or in-kind donation – equipment, personnel technical support, provisions for service facility)
g. Adequate counterpart funding from the implementing and partner agencies
h. Risk Management Plan
i. Technology Roadmap.

4. Technology Readiness Level between 2-6. It should encompass Technology Formulation, Validation of Technology, Small-Scale Prototype, and Large-Scale Prototype (if applicable).
5. Clear plans for utilization of project results:
    a. Strategies for wider adoption by indicating how the project results can be scaled up to be widely used or available
    b. Details on how the target beneficiaries will participate or benefit from the project
    c. Plans for promotion and transfer of technology to end-users
6. Sustainability plan including established mechanisms in terms of institutional, financial, and human resources capability after project completion.

3.6.1 Footwear Program

Call Rationale

The Philippine footwear market reached USD 3.5 billion in 2024 and is projected to grow to USD 6.49 billion by 2033 (CAGR 6.7% from 2025–2033). Growth is driven by rising incomes, urbanization, e-commerce, fashion awareness, demand for sustainable products, and an expanding middle class, highlighting the sector's strong potential for innovation and R&D (https://www.imarcgroup.com/philippines-footwear-market).
Focus Group Discussion (FGD) results indicate persistent challenges that have constrained the subsector's growth, including:

a. Outdated or worn-out equipment for traditional shoe-making processes
b. Limited number of skilled artisans (sapateros)
c. Restricted marketing opportunities for local products
d. High volume of imported low-cost footwear
e. Limited availability of raw materials locally
f. Lack of advanced footwear design tools and technologies
g. Diminishing institutions offering training, education, and R&D in footwear production and design

In 2025, this subsector supported two completed projects on insoles and sustainable footwear materials, alongside one ongoing project and one new project set to commence this year. These initiatives focus on developing technologies for footwear comfort, components, and the integration of natural fibers, incorporating Filipino fit and sizing, as well as design-oriented R&D. Efforts also

continue to advance sustainable textile technologies for footwear applications, reinforcing innovation, functionality, and environmental responsibility.

Despite the market potential and ongoing R&D efforts, no proposals were submitted under this subsector in the last call for proposals. This call aims to encourage and support the submission of innovative projects that address persistent industry challenges, promote sustainable and locally adapted technologies, and strengthen the competitiveness of the Philippine footwear industry in both domestic and international markets.

Call Scope

To address these gaps, the Council will provide fund support for the following research areas:

A. Material Innovation for Footwear Applications: R&D on Sustainable Local Materials for Footwear, including for uppers and banhay (platforms of slippers and wedge shoes).

B. Footwear Design and Technologies

- R&D on Specialized Footwear, including Smart Footwear Design for Enhanced Functionality and Performance
- R&D on Design for Footwear, including Optimization Advanced Simulation Software for Footwear Design and Manufacturing

Target Program/Projects: 2
Total Budget: 30M

3.6.2 Furniture Applications Program

Call Rationale

The Philippine furniture market is valued at approximately USD 844 million in 2025, with projections to reach USD 1.7 billion by 2033, reflecting steady expansion of both domestic and export demand (https://www.sunstar.com.ph/amp/story). Growth is driven by increasing urbanization, rising disposable incomes, and heightened consumer interest in home improvement and interior design. Demand has shifted toward modern, eco-friendly, and sustainable furniture, highlighting evolving lifestyle preferences and the Philippines' potential as a supplier of high-quality, design-driven furniture in both local and international markets (https://www.globenewswire.com/news-release/2024/10/31/2972654/28124/en/Philippines-Wooden-Furniture-Export-Industry-Report-2024-2033-Focus-on-Japan-United-States-Singapore-Canada-Netherlands-and-South-Korea.html).

FGD results highlighted several persistent challenges in the subsector, including:

a. Inconsistent quality of raw materials, particularly natural fibers and wood sourced from provincial areas.
b. Limited access to modern pre-treatment and pre-processing equipment in source regions.
c. Minimal R&D engagement, as most research institutions and universities focus primarily on design rather than process or material development.
d. Difficulties among some industry players in transitioning from conventional methods to modern design and manufacturing tools.

These constraints underscore the need for targeted research and development programs to enhance material quality, process innovation, and design capabilities, supporting the sector's competitiveness and global export potential.

Call Scope

The program covers project proposals incorporating innovative solutions and research in material innovation and design tools in the following areas/priorities:

A. Materials Development & Innovation
    a. Development and standardization of novel natural and synthetic materials for furniture, including:
        i. Outdoor: bamboo (kawayang tinik), plastic rattan, and other innovative sources
        ii. Indoor: abaca fiber and other novel materials
    b. Bio-based adhesives, finishes, and resins with low formaldehyde and VOC for plywood and other engineered wood products
    c. Valorization of waste materials for paddings and panels (e.g., wood shavings, agricultural residues)
    d. Sustainable and biodegradable furniture packaging and filler materials

B. Furniture Design and Application
    a. AI-based solutions - Furniture Design tools

Target Program/Projects: 3
Total Budget: 70 M

IV. Science Communication Sector

Science Communication for Innovation Program

Call Overview

The DOST - Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD) is offering support for Science Communication proposals for 2027 funding. The call is open to all science communicators, researchers, DOST information officers, and other key players of the said discipline. It is anticipated that the R&D funding will lead to an inclusive, integrated, and innovative approach of science communication in the country.

Call Rationale

Science Communication (Scicom) is a growing area of practice and research (Burns, 2003) that plays a vital role in today's development challenges. The Philippines, although having a rich documented history of science and its development (e.g. Anderson, 2007 Velasco & Baens-Arcega, 1984), still needs to delve into the "identity" or "face" of Scicom in the country.

The weak state of science culture in the Philippines is brought by several factors one of which is the Filipino attitude towards science and the traits distinct to it, or the whole science culture. This

scenario is experienced in a typical Filipino home as well as in schools. (Licuanan 1998, Nebres & Intal, 2007)

It is in this light that constant efforts should be made to foster science culture in a variety of ways. First is to improve science communication throughout the nation while educating influential figures in academia, the media, and the scientific community. Secondly, is to make the most of the museum's potential as a resource for nontraditional education.

Efforts in promoting and communicating science are continually initiated by DOST in collaboration with other significant key players in the scientific and non-scientific community. Recently, DOST's Science Communication Agenda was put into place along with the presentation of DOST's Harmonized Science Communication Framework that was projectized thru UPLB-College of Development Communication (CDC). Meanwhile, the Science Communication Roadmap is being updated along with other undertakings in the said field.

From 2023 to 2025, Stakeholders' Consultations were conducted by the PCIEERD Information Group to update the existing Science Communication Roadmap, which focused on the role of scientific communication in the nation, the value of science centers as a vehicle for communicating and disseminating information in science, and the emphasis on research extensions on accelerated communication to DOST R&D projects.

These consultations identified gaps in areas such as basic research, evaluation metrics, and Scicom technologies. Thus, it is vital to maintain endeavors towards an integrated, inclusive, and innovative strategy on science communication in the country through R&D support.

The following are the specific objectives of the call:

1. To provide R&D support for research on science communication
2. To provide R&D support for the establishment and/or development of science communication infrastructure, science centers, and technologies.

A. **<u>Research Extension to Accelerate Communication (REACH) Program</u>**

To extend assistance to researchers and innovators who have completed the council's R&D training and aim to diversify the study's integration to create science and technology-based solutions. The program will focus on showcasing the research output through information and dissemination initiatives that cater to a specific audience of their information and dissemination activities.

1. **Development of Information & dissemination activities**

Call Objective

- Proposed projects that are aimed to develop any of the following:
    a. Capacity building among targeted beneficiaries (seminars, conferences, town hall meetings)

b. Promotional and public engagement efforts like press conferences, media engagements, media buying, exhibitions

Call Scope and Budget

PCIEERD will fund research on the development of information and dissemination activities with a maximum budget of Two (2) Million Pesos per year per project. The proposed project should run for a period of one to two (1-2) years only.

2. Production of IEC materials

Call Objective

- Proposed projects that are aimed to develop materials to include traditional and non-traditional methods such as learning management systems, knowledge management systems, websites and social media accounts, video production, physical kiosks and among others in selected locations

Call Scope and Budget

PCIEERD will fund research on the development of information and dissemination materials with a maximum budget of Three (3) Million Pesos per year per project. The proposed project should run for one to two (1-2) years only.

QUALIFICATION REQUIREMENTS

- Completed R&D and Non-R&D Projects supported by DOST-PCIEERD that aim to conduct activities for knowledge sharing and information dissemination. (Supported with terminal reports)
- The initiative's project leader can continue to serve as the project leader with assistance from a co-project leader who is a science communication expert and who will serve as the focal person for information sharing and promotions. (Supported with CV and track record)
- With measurable projected outcomes that can benefit its intended audience with a minimum of one year-period or a maximum two-year period project implementation
- With sustainable plans to guarantee that the project will continue its effort to disseminate information even after the project completion.
- Letter of commitment from beneficiary agency, partners, cooperating organizations/stakeholders.

REACH Program	**Budget Allocation**	**Duration**
Call Themes		

Development of Information & Dissemination activities	Php 2,000,000.00	1-2 Year/s
Production of IEC materials	Php 3,000,000.00	2-3 Years

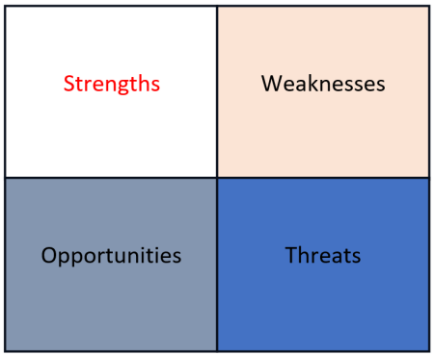
Application Requirements

1. Letter of Intent and Commitment *
2. Endorsement letter from the Head of Agency or Institution
3. Application Form
4. Curriculum Vitae (Project Team- including the science Communication consultant/ experts in the project)
5. Communication Plan (See Annex A for template)
6. Final Terminal Report of the DOST/ DOST PCIEERD Project (DOST Form 15)

(Guidelines in Writing a Communication Plan)

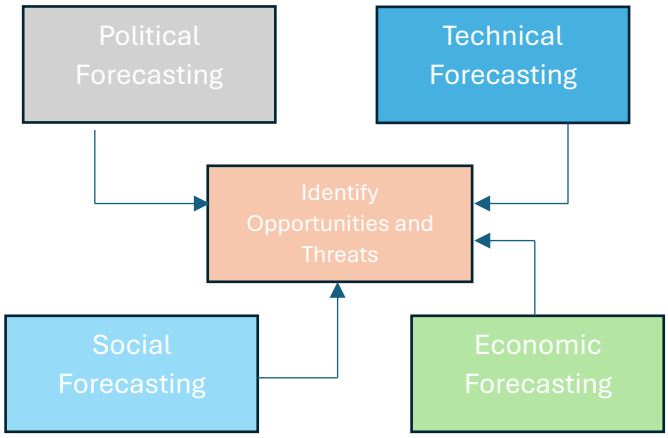
Introduction: The introduction should have the following key points:

- Discuss the project and what it is all about. The project can use three methods or frameworks, like the SWOT **(Strengths, Weaknesses, Opportunities, Threats)** analysis framework or the **PEST (Political, Environmental, Social and Technological) Evaluation or the (Political, Economic, Sociological, Technological, Legal and Environmental)** analysis framework, to create the narrative for the introduction.
    a. Situation analysis is a helpful instrument for evaluating the general performance and capabilities of an organization. The project can investigate both the internal and external settings when conducting a situation analysis. The SWOT analysis may be the ideal tool in this regard.
- **SWOT (Strengths, Weaknesses, Opportunities, Threats) Analysis:** A SWOT analysis lets you look at the organization's strengths and weaknesses, as well as its possibilities and risks in the external environment. This framework is also a great way to explain why the study is essential and what it seeks to achieve. SWOT helps in **identifying the key communication goals and objectives and developing strategies for achieving them**.



- **PEST (Political, Environmental, Social and Technological) Evaluation**

When using a PEST method, you can look at the political, environmental, social, and technological aspects that affect your organization's external environment and can have a big impact on how your business operates. PEST is best used for SciComm projects that also deals with marketing and advertising operations and concepts.



- A PESTLE analysis studies the key external factors (political, economic, sociological, technological, legal, and environmental) that influence an organization. It can be used in a range of different scenarios. PESTLE is best used in the context of science communication and in the introduction to a communication plan to analyze, detect, and understand broad, long-term trends. If the project being proposed deals with brand positioning, growth targets, risks, and productivity in a specific science communication gap/threat, this framework can be used in the narrative of a strong introduction.

The introduction should also answer the following questions:

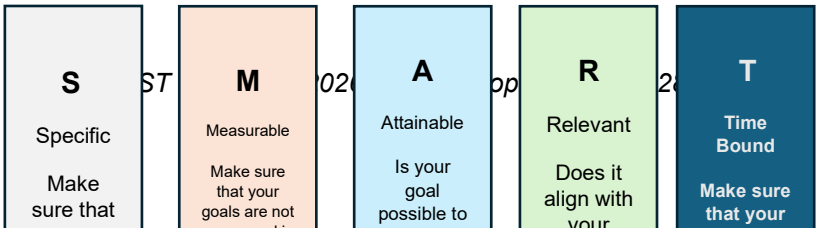
1. Why is a communication plan necessary, and what is the purpose of the project?
2. The project should include a brief approach and premise on the planned goals and objectives of the project, as well as how they would want to be implemented in this area.
3. When submitting a grant proposal for the REACH Program, it is necessary to include a brief overview of the former DOST / DOST PCIEERD study. It should provide an update on the project's status, explain why this plan is necessary, and explain how it will change the project or proposal considering the communication direction.

I. Objectives:

Identify and define objectives and goals. Once you know where you stand, you can find your direction. The next step is to define your goals. Think of the outcomes and results you want to achieve from your communication plan. These will become your goal(s) as you develop your communication plan.

Make sure that the goals you select are SMART:

SMART GOALS



(Example):

The DOST-PCIEERD's 13th anniversary celebration aims to promote its world class innovations for the Filipino People.

Particularly, this aims to:

- *Acknowledge DOST stakeholders through award recognition on the following:*
  - ***Kabalikat Awards:** A recognition for Startup, Academic, Government, and Private*
  - ***WHW Awards**: A recognition for women entrepreneurs under the Women-Helping-Women: Innovating Social Enterprises Program*
  - ***Excellence in Project Implementation and Completion (EPIC) Awards:** A recognition for the project leaders who excel in their project implementation.*
- *Introduce new and budding research and researchers on industry, energy, and emerging technologies.*
- *Foster strong and continued collaborations with different sectors*
- *Increase social media presence by reaching at least 100 additional PCIEERD followers within the promotion phase of the 13th anniversary.*

II. ***Key Messages:** The key messages are the main points you want your audience to hear, understand, and remember. They are succinct summaries of your work that emphasize your methodology, contributions to stakeholders, and unique selling features.*

III. Target Audience, Media Channels, and Strategy

Prior to selecting the media channels and strategy, the target audience needs to be identified. Before creating media channels and methods, the proponents ought to take psychographics and demographics into account, as the target audience in this matrix ought to be readily apparent. The study and categorization of individuals based on their attitudes, goals, and other psychological parameters is known as psychographics, and it is particularly used in market research. The study of a population according to its age, race, and sex is known as demographics.

When developing your media channel strategy, consider the most efficient channels that come to mind when organizing the distribution of information about media channels and approaches. When you communicate with various audience segments, be careful to choose the right channel.

The proponent can use the following matrix: (Example):

Key Message	*Target Audience*	*Strategies*	*Channels*	*Expected Outputs*	*Date of Implementation*	*Weighted Mean*
Food Innovation Center is the lead provider of food technologies in the region	*Small and midsize enterprises (SMEs) owners, ages 45-55*	*Press conference about the importance of the project*	*Face to face press conference*	*20 media outlets present during the press conference from the local and national media (traditional and new media)*	*2nd quarter of the project* *End of May*	*20%*
		Social Media Posting	*Facebook, Instagram,* *Websites*	*20 collateral to each media platform, in the first 2 weeks of implementation*		

(Sample Communication Plan)

I. Introduction:

This communication plan captures the entire scope of communication strategies for the 13th PCIEERD Anniversary with the theme **"Philippine Innovation Expo: Celebrating Excellence through Innovative Collaboration,"** organized by the Department of Science and Technology—Philippine Council for Industry, Energy, and Emerging Technology Research and Development (DOST-PCIEERD). Different tactics will be implemented, including promotions and invitations through traditional and new media, including but not limited to the production and publication of news articles, the production of promotional materials, and coordination with various local and international partners in academia, industry, and the media.

II. Objectives:

The DOST-PCIEERD's 13th anniversary celebration aims to promote

- Acknowledge DOST stakeholders through award recognition on the following:
    - **Kabalikat Awards:** A recognition for Startup, Academic, Government, and Private
    - **WHW Awards**: A recognition for women entrepreneurs under the Women-Helping-Women: Innovating Social Enterprises Program
    - **Excellence in Project Implementation and Completion (EPIC) Awards:** A recognition for the project leaders who excel in their project implementation.

- Introduce new and budding research and researchers on industry, energy, and emerging technologies.
- Foster strong and continued collaborations with different sectors
- Increase social media presence by reaching at least 100 additional PCIEERD followers within the promotion phase of the 13th anniversary.

I. Key Messages

- DOST-PCIEERD is the Nexus of Innovation through excellence and collaboration**.**
- DOST-PCIEERD is your partner in innovation in industry, energy, and emerging technologies.
- DOST-PCIEERD welcomes public and private partnerships.
- DOST-PCIEERD pushes the boundaries of innovation, exhibiting cutting-edge robotics demonstrations through the Megaworld Corporation.
- DOST-PCIEERD recognizes the contributions of its collaborators.

Target Audience, Strategies and Media Channels

Key Message	Target Audience	Strategies	Media Channels	Date of Implementation	Weighted Mean (%)
DOST-PCIEERD is the Nexus of Innovation through excellence and collaboration	Businessmen Industry Players Start Ups NGAs Innovators Researchers	Traditional and Digital Media interviews Holding conducting Events Press conference Robotics Exhibit with Megaworld Social Media Campaigns Email Blast On-ground activation	Three Media Interviews WITH GMA 7, The Philippine Star and Rappler	January-February 2024	20%

IV. Impact Assessment

DRIVING INNOVATION THROUGH EVIDENCE: IMPACT ASSESSMENT OF DOST PROJECTS

Call Rationale

This call for proposals emphasizes the importance of both ex-ante and ex-post analyses in the evaluation of projects.

Ex-ante analysis serves as a predictive tool, offering a forecast of potential outcomes that aids in designing interventions likely to achieve their intended goals while mitigating possible risks. By

projecting the likely impacts and benefits before project implementation, this analysis allows for necessary adjustments and improvements, ultimately enhancing the effectiveness of the interventions.

Conversely, ex-post analysis provides a retrospective assessment of actual outcomes and impacts following project completion. This evaluation is essential for measuring the success of the intervention, understanding its long-term effects, and extracting valuable lessons learned. It enables an evaluation of whether the project met its objectives and offers insights that can inform future initiatives.

Through systematic evaluation, the Department of Science and Technology (DOST) can ensure that its investments are impactful and aligned with its strategic goals. This process not only optimizes resource allocation and informs future decision-making but also demonstrates value to stakeholders. By reinforcing its commitment to scientific advancement and socio-economic development, DOST reaffirms its role as a catalyst for progress and innovation in the Philippines

Objective

This call aims to evaluate and quantify the social, economic, and environmental impacts of completed and proposed projects funded and monitored by DOST and PCIEERD. These assessments will be conducted through comprehensive ex-ante and ex-post analyses.

Call Scope

Proposals should assess the impacts of the following research and development projects:

1. For Ex-Posts Analysis:
   - Energy Projects
   - Bamboo related projects
2. For Ex-Ante:
   - Industrial Biotech Products

If interested, documents related to the R&D projects for assessment may be requested from the Policy Unit of the Policy Coordination and Monitoring Division (PCMD) of DOST-PCIEERD. Access to these documents will be granted upon the execution of a Non-Disclosure Agreement (NDA).

Specific Features Sought in this Call:

The proposed projects should demonstrate the following characteristics and should be well-written in documents:

Ex-Post	Ex-Ante
• Describe the processes and dynamics involved in the conceptualization, formulation, and implementation of various DOST and/or PCIEERD-funded programs/projects; • Validate the R&D programs/projects' theory of change and impact pathways;	• Describe the processes and dynamics involved in the conceptualization, formulation, and implementation of various DOST and/or PCIEERD-funded programs/projects; • Develop the programs/projects' theory of change and potential adoption/impact pathways;

• Determine the actual direct and indirect outcomes and impacts associated with the programs/projects; • Estimate the economic returns from the programs/projects; • Identify the best practices and lessons learned during and after the implementation of the programs/projects; • Formulate policy recommendations for the improvement and sustainability of the programs/projects.	• Estimate the potential outcomes and impacts associated with the programs/projects; • Formulate policy recommendations for the improvement and sustainability of the programs/projects.

PCIEERD will fund/endorse two (2) Ex-post projects and one (1) Ex-Ante project not to exceed PhP 15M budget covering all projects. The maximum duration for each project is 1.5 years for PCIEERD-GIA and 2 years for DOST-GIA respectively. The breakdown is as follows:

	Themes	Budget (in PhP)	Fund Source
	Ex Post		
1	Impact Assessment of DOST/PCIEERD Energy Projects	5M	PCIEERD-GIA
2	Impact Assessment of DOST/PCIEERD Bamboo Projects	5M	DOST-GIA
	Ex Ante		
3	Industrial Biotech Products	5M	PCIEERD-GIA

V. Science for Change Program (S4CP)

The Science for Change Program (S4CP): Accelerated R&D Program for Capacity Building of Research and Development Institutions and Industrial Competitiveness was created to accelerate science, technology and innovation (STI) in the country to keep up with the developments wherein technology and innovation are game changers. Through the Science Change Program (S4CP), the DOST can significantly accelerate STI in the country and create a massive increase in investment on S&T Human Resource Development and R&D.

The S4CP has four component programs, namely: (1) Niche Centers in the Regions for R&D (NICER) Program, (2) R&D Leadership (RDLead) Program, (3) Collaborative R&D to Leverage PH Economy (CRADLE) and (4) Business Innovation through S&T (BIST) for Industry Program.

1. Niche Centers in the Regions for R&D (NICER)

NICER is a component program of the Science for Change (S4C) Program. It is being implemented to capacitate Higher Education Institutions (HEIs) in the regions to make significant improvements in regional research by integrating developmental needs with existing R&D research capabilities and resources.

The DOST will provide institutional grants for Higher Education Institutions (HEIs) to establish a NICER that will help improve their S&T infrastructure and provide for quality research that will catalyze and promote regional development. Previously-funded NICER projects which are ready for Phase 2 are also encouraged to submit proposals.

The DOST is now ready to accept R&D proposals for 2027 funding from HEIs and their partner RDIs, NGAs, and NGO/POs for the NICER Program. The R&D proposals to be submitted should provide a solution to the identified needs of the region and meet the general criteria of the program.

Who may apply?

1. All Higher Education Institutions (HEIs) with proven competence and track record in R&D as well as impact on the local industry may apply.
2. All existing NICERs that have completed their program implementation may submit new R&D proposals under their respective niche program.
3. Ongoing NICERs with at least one (1) year of implementation and high accomplishment rates may also submit proposals for additional R&D components.
4. Any HEIs, RDIs, NGAs, or NGOs/POs who will collaborate with existing NICERs.

2. Research and Development to Leverage Philippine Economy (CRADLE)

CRADLE encourages synergistic relationships among the academe, research and development institutions, and the industry through collaborative Research and Development (R&D) projects. Under the CRADLE Program, a local industry partner determines a problem/need which requires an R&D solution, the partner higher education institution (HEI) or Research & Development Institution (ROI) undertakes the R&D to solve the problem/need, and DOST provides funding support to the project of up to PHP 5 million for a period of 1 - 3 years.

The DOST is now ready to accept R&D proposals for 2027 funding from HEIs/RDIs together with their partner company for the CRADLE Program. The R&D proposals to be submitted should provide a solution to the identified needs of the industry and meet the general criteria of the program.

Who may apply?

Any duly recognized HEI or RDI with a proven track record in R&D in partnership with at least one Filipino--owned company which has been registered and operating for at least 3 years.

To be an eligible industry partner, the company must:

1. Be Filipino owned (at least 60% ownership)
2. Be operating in the Philippines for at least 3 years and be able to provide proof of active compliance with statutory regulations

3. Provide at least 20% of the project cost as counterpart funding (in cash, in kind, or person -hours)
4. Commit to adopt the output of the research through signing a technology adoption certificate. Plans for the use of the proposed technology and the mode of technology transfer after the project must be included and clearly discussed in the business plan.
5. Show how the research output will be adopted

All proposals must be in line with the priority of R&D areas and industries identified by the DOST.

Intellectual Property Concerns

The HEI/RDI and its partner company are encouraged to start discussions and agree on the IP rights/ ownership as early as the Proposal Writing stage. A Collaborative Research Agreement (CRA) including details on the IP rights and the method of technology transfer must be executed by the HEI/RDI and the partner company to formalize the agreement.

3. I-CRADLE Program

The DOST aims to expand the benefits of university-industry collaboration through the Industry-level CRADLE Program (I-CRADLE). In the I-CRADLE Program, industry-wide problems or needs shall be identified and solved through R&D with the goal of increasing the competitiveness of Philippine industries.

Under the I-CRADLE Program, industry-wide needs and problems will be determined through appropriate methods, which may include but are not limited to consultations, surveys, and focused group discussions, with companies belonging to the same industry. The HEIs and/or RDIs which are experts in the identified field, shall undertake research and development. Funding shall be provided by the DOST, complemented by counterpart funding from the collaborating parties from the industry sector and the HEI and/or RDIs. Together, the academe as the producer of knowledge and human resource, and the industry as the entity that translates technologies to real-world applications, shall generate new opportunities for Filipinos in the form of new industries, enterprises, jobs, and solutions to pressing community and national problems. The collaboration shall ensure the timeliness and relevance of R&D endeavors, with reference to practical and pressing national needs.

Who may apply?

Any duly recognized HEI/RDI with a proven track record in R&D in partnership with a Partner Industry Association or Group defined as any of the following:

1. Industry association, duly registered in any of the regulating agencies and represented by the trade association's head of agency and at least five (5) member companies;
2. A group of at least five (5) individual companies belonging to the same industry; or
3. A secondary or tertiary cooperative, represented by the head of agency and at least five member cooperatives (as defined in the https://cda.gov.ph)

To be an eligible industry partner, the company must:

1. Be Filipino-owned (at least 60%)
2. Be operating in the Philippines for at least 3 years and be able to provide proof of active compliance with statutory regulations (such as the most recent business registration and business permits)
3. Provide at least 40% of the project budget as counterpart funding (in cash, kind, or person hours)
4. Commit to adopting the output of the research (by signing a technology adoption certificate). Plans for the use of the proposed technology and the mode of technology transfer after the project must be included and clearly discussed in the business plan.
5. Show how the research output will be adopted