

Terms of Reference (TOR)
for the
Conduct of Feasibility Study (F/S) for the Establishment of a Research
Reactor (RR)

1. BACKGROUND/ RATIONALE

1.1. Contracting Authority

The General Appropriations Act (GAA) of FY 2014 has allocated the amount of PhP400,000,000.00 for the conduct of feasibility studies (F/S) to be administered by the National Economic and Development Authority (NEDA). Thus the Department of Science and Technology – Philippine Nuclear Research Institute (DOST-PNRI) submitted the F/S for the Establishment of a Research Reactor (RR) to NEDA for consideration under said Fund.

For this Terms of Reference (TOR), NEDA shall be the Executing Agency while DOST-PNRI shall be the Implementing Agency. The proposed project is consistent with PNRI's mandate and major programs/projects/activities (PPAs).

1.2. Relevant Country/ Sector Context

The proposed study is in line with the current Philippine government policy which states that nuclear power is a future option for energy production and that the country should prepare for it. There is also a national policy for continuous development of scientific & technical knowledge and this study will greatly help advance the country's capacity for nuclear science and technology. In the context of the 2011-2016 Philippine Development Plan (PDP), the proposed study will support efforts in different areas, such as (a) reduction in country's dependence on imported radioisotopes which are utilized in various fields; (b) potential of an RR to provide services in metrology, radiography, materials analysis, process efficiency, and isotope supplies for the medical and industrial fields; and (c) radioisotopes produced from an RR has been used in agricultural studies (to optimize crop yields) and in environmental studies.

1.3. Current State of the Relevant Sector

The Philippine Nuclear Research Institute (PNRI) is the sole agency of the Philippine government mandated to advance and regulate the safe and peaceful applications of nuclear science and technology in the country. In order to fulfil this mandate, when PNRI (formerly Philippine Atomic Energy Commission [PAEC]) was created in 1958, initial efforts were focused on manpower development as well as the acquisition of the 1 MW Philippine Research Reactor (PRR-1) and its associated laboratories.

PRR-1 which attained its first criticality on August 26, 1963, has been utilized primarily as source of neutrons and nuclear emissions for radioisotope production, activation analysis of materials, irradiation studies and for basic and applied sciences research. It was used for developing human resource for the operation, maintenance and utilization of RRs. It also became a teaching reactor which catered to plant operators and regulators for the first

Philippine Nuclear Power Plant (PNPP-1). In 1984, PAEC decided to convert the PRR-1 to a TRIGA Mark III reactor. The converted reactor attained criticality on April 1988 demonstrating successful conversion; however, a technical problem which was not resolved has rendered the reactor inoperable since 1988. This led to the decision of PNRI to decommission PRR-1 in 2005. Since then, efforts in connection to reactor operation have been geared towards a decommissioning plan. However, without an operating nuclear facility in the country, maintaining a critical number of personnel knowledgeable and skilled in nuclear science and engineering has proved to be a major drawback and challenge.

1.4. Related Projects/Programs and Other Donor Activities

There is an existing proposal in PNRI to re-use the Philippine Research Reactor 1 (PRR-1) and its fuel elements in a subcritical assembly for training and education in nuclear science and engineering. This project has been approved by the PNRI Director, however, funding is yet to be sourced for this activity to commence. The existing PRR-1 project will complement the study described in this TOR by providing basic training and education for future stakeholders who will be involved in the operation and utilization of the proposed RR.

2. OBJECTIVE EXPECTED RESULTS

2.1. Overall Objective of the Study

The objective of the study is to determine the potential of an RR in helping the advancement of country's capacity in nuclear science and technology.

In particular, the study shall cover the technical, socio-economic, financial, and regulatory aspects of establishing an RR facility. During the course of the study, efforts will be made to also examine the available financing options or schemes that can be used to implement the identified RR facility. Hence, the study should be able to provide firm, detailed information that will become the basis for DOST-PNRI to authorize subsequent implementation of the viable project.

2.2. Expected Output of the Study

By the end of the contract period, the Consulting Firm is expected to produce a Pre-Project Assessment Report (PPAR) which comprises of the following:

- a) Preliminary Assessment
 - Stakeholder profiles;
 - Analysis of public perception; and
 - Rationale and justification for the RR.
- b) Techno-Economic Evaluation
 - Draft functional specification for the RR and its ancillary facilities;
 - Recommendations for the site of the RR;
 - Recommendations on personnel requirement for the RR operation and utilization; and
 - Analysis of the economic and financial viability of the RR.

- c) Policy and Organizational Framework Evaluation
 - Analysis of government commitments associated with operation of an RR;
 - Analysis of existing organizations who will operate the RR;
 - Recommendations for updating relevant legislations and regulations; and
 - Identified role of the RR in the regional and international contexts and the requirements and options for regional and international cooperation.

3. ASSUMPTIONS AND RISKS

3.1. Assumptions Underlying the Project Intervention

The proposed study assumes that consultants will be comprised of qualified experts who have experience with, and particular interest in, RRs.

3.2. Risks/Limitations

Given the current status of nuclear science and technology in the country, there may be a limited number of people who can qualify as expert to participate in this study. It will be necessary to request for international experts who can assist local counterparts during the conduct of the study under this TOR.

4. SCOPE OF THE WORK

The Pre-Project Assessment Report (PPAR) is the main output of this F/S, and will be used to inform national decision makers, project sponsors, users and other stakeholders. This shall involve both office and field exploratory works. It shall be the responsibility of the Consulting Firm to formulate a suitable planned approach and methodology necessary in the proper execution and completion of the work, which shall be based on standard processes and engineering norms for nuclear reactors and/or installation.

The PPAR will include a utilization study. Suggested references for this utilization assessment are the International Atomic Energy Agency's (IAEA) Technical Reports Series No. 455, *Utilization Design Features of Research Reactors: A Compendium* and IAEA-TECDOC-1234, *Applications of Research Reactors*. The report will provide the conceptual facility functional design, including RR type and power, ancillary facilities, rough project costs and schedule estimates.

The study shall involve, but not limited to, the following work phases:

1. Preliminary Assessment - Shall be conducted in a manner similar to an RR projects inventory where the stakeholders and potential of pre-identified sites to support the project shall be identified, assessed and catalogued;
2. Techno-economic Evaluation - Shall be conducted to determine the technical, economic, and financial viability of the proposed RR project; and
3. Policy and Organizational Framework Evaluation – Shall be conducted to identify and evaluate related policies and legal issuances concerning RR safety. The same shall also include an assessment of potential regional and international areas for cooperation.

The study, as it tries to identify viable RR project sites, shall be of nationwide coverage – beginning with cities having significant potential for nuclear RR development.

On value/option analysis, the Consulting Firm should be cognizant of the following requirements: Sustainability of project and resources, viability and sustainability, operational economy and simplicity, health improving schemes, and other such considerations that may contribute to the cost-effectiveness of the project.

Furthermore, the Consulting Firm shall look at alternative options to deliver the outputs and objectives of the projects (e.g., may include new available technologies, among others), including the associated costs, benefits and risks involved. The Consulting Firm shall select the best alternative and/or project components that would most appropriately respond to the project objectives and outputs, and yield the highest VfM, e.g., lowest lifecycle/whole-of-life costs, the use of other RR technologies and the options for subscribing to a regional center as an alternative to the establishment of a national RR facility.

4.1. Detailed Description of Activities

4.1.1. Preliminary Assessment

The focus here shall be on establishing the rationale/background, need, and justification for the proposed RR. To be conducted under the concept or scope of typical projects inventory, this work phase shall include the following tasks:

1. *Identification of potential stakeholders and quantify stakeholder needs*

Potential stakeholders and supporters of the RR, as shown in item 4.1.3, should be identified, both nationally and regionally. The study should quantify and evaluate the relative importance of each of the RR applications for each of the identified potential stakeholders. If possible, representatives of stakeholder groups should be consulted during this process, both to better understand the potential value and possible characteristics of the research reactor, and to present information on how an RR might contribute to their goals.

Prepare a list of individuals from potential stakeholder organizations to be contacted for the pre-project planning and consultation and then identify organizational facilitators. Develop a potential stakeholder profile by considering their objectives and their interest or need for the RR utilization features and facilities. Prepare presentation materials for the identified persons that sets out the possible contribution of the research reactor to the individuals objectives. Use prepared surveys to collect relevant data in discussion with the identified individuals, based on their experience, qualifications, current and expected future technical needs.

It is recommended that stakeholder consultations/meetings be conducted by inviting representatives from the local government units and the medical, industrial, agricultural and academic sectors. At least three (3) consultation meetings can be held to ensure that enough stakeholders will be engaged during the preliminary assessment. These meetings shall include, but is not limited to the following: presentation of the potential capabilities

of the RR, discussions and workshops of how each stakeholder group can benefit from the RR, and evaluation of the stakeholders' perception towards the RR. It is also recommended that the meetings be held in locations which are relatively accessible to the targeted stakeholder groups, preferably one each in Luzon, Visayas, and Mindanao, for the purpose of maximizing their potential engagement.

2. *Evaluation of public perception and the corresponding challenges and opportunities.*

A survey research will be conducted to evaluate public perception on the research reactor. This study should provide information on the demographics of the surveyed group and a means to quantify public perception. Data obtained from this study should be analyzed for potential impact to the proposed project. If the results show negative public perception, intervention plans should be recommended which may include communication plans, promotional activities and other similar activities.

3. *Determining the rationale for the establishment of an RR*

Based on the information gathered from the two preceding activities, prepare an evaluation of the range of applications of the proposed RR that is most beneficial and which will best address the needs of the Philippines. The report shall also place due consideration to potential technology/design alternatives that may likewise address the identified stakeholder needs.

4.1.2. Techno-Economic Evaluation

This work shall be performed to draft functional specification of an RR project and appraise its economic and financial viability.

Value/Option analysis concepts will also be applied in the conduct of the techno-economic evaluation, including assessment of costs and risks for each option, to determine the most viable option that would result to the highest Value for Money (VfM) for government.

Specifically, this shall involve the following activities:

1. *Development of the facility specification.*

The needs and applications identified for the RR should be translated into a draft functional specification for the research reactor and its ancillary facilities that will allow the appropriate technical features to be developed. Estimates of investment cost, operation cost, decommissioning cost, and financial uncertainties should be prepared. The functional specification must undergo preliminary evaluations of:

- Time and cost to design, construct and commission;
- Safety and regulatory requirements;
- Resources required to operate and maintain (including fuel costs);
- Resources to dismantle and decommission;
- Impact on the costs of radioactive wastes and spent fuel management and disposal;
- Regulatory (nuclear, environmental, etc.) oversight and approvals of each item above.

Facility concept design can be prepared by defining the following:

- Reactor power level;
- Irradiation and beam facilities requirements for example for isotope production;
- Safety performance requirements;
- Security and safeguards requirements;
- Emergency procedures and planning requirements;
- Core design and performance (nominal operating cycle and fuel design);
- Fuel cycle management requirements (fresh/spent fuel storage, inspection hot cells, handling equipment and casks);
- Ancillary facilities (beam hall, office space, hot cells, etc.);

2. Selection of site for the research reactor.

Primary and secondary data will be utilized to determine potential RR sites. In general, the suitability of a site for a RR will be evaluated by considering the following aspects¹:

- Effects of external events that may occur in the region of the site (could be of natural or human induced origin);
- Characteristics of the site and its environment that could influence the transfer to humans of released radioactive material;
- Population density and population distribution and other characteristics of the site vicinity of relevance to possible emergency measures and the need to evaluate the risks to individuals and the population;
- Other nuclear facilities at the site.

To ensure the selection of the most appropriate site for the RR, it is recommended that the consulting firm conduct off-site and onsite (e.g. hydrology, geology, topographic, environmental status assessment, agro-economics and land use, etc.) evaluation/investigation of potential RR sites nationwide using available secondary/primary data.

3. Identification of personnel requirement.

Identify the specialized training for the full range of scientific and technical disciplines needed for the research reactor project. Assess the availability of these disciplines within the country. Assess national educational capabilities and the option for foreign education and training. Conduct a gap analysis and identify specialized training needed even for experienced personnel in nuclear safety, security, safeguards, radiation protection and management systems. Propose a realistic plan to develop and maintain the human resource requirement in conjunction with all parties which will be involved in the research reactor project.

4. Analysis of the economic and financial viability.

Determining the project inflows and outflows to assess the financial viability of the project. Determine economic costs and benefits to assess the economic viability of the project.

¹ Safety of Research Reactors : Safety Requirements. — Vienna : IAEA Safety Standards Series, ISSN 1020-525X ; No. NS-R-4, 2005.

4.1.3. Policy and Organizational Framework Evaluation

1. Identification and evaluation of existing policy and organizational issues

Develop a thorough understanding of the long term governmental obligations and commitments and the national strategy to achieve these commitments. Commitments and obligations that should be assessed should include the following:

- Adherence to the relevant international treaties, conventions, and codes;
- Potentials for regional and international cooperation;
- The establishment of a legal framework for the nuclear sector;
- The establishment and continued resourcing of an independent and effective regulatory body;
- The long term strategy for providing financial resources to support all phases of the research reactor project (design, construction, commissioning, operation, decommissioning and final waste storage);
- Procurement of fuel for the reactor;
- Spent fuel storage, processing, repatriation or final disposal, as appropriate;
- Long term radioactive waste management issues, including facilities for long term storage and final disposal;
- Security for the research reactor facilities and technology and the radioactive materials it will generate;
- Intergovernmental agreements to secure ongoing technology support, and spent fuel and waste management;
- The need to develop and retain the necessary skills; and
- Long term policy in nuclear education and human resource development.

In assessing the latter, the study shall consider the appropriate organizational structure, reporting relationships and internal performance measures for the RR operator. Furthermore, recommendations shall be made on the necessity to update existing legislative and regulatory framework relevant for all activities involving the research reactor, from the planning stage to the decommissioning stage.

4.1.4. Geographical Area to be Covered

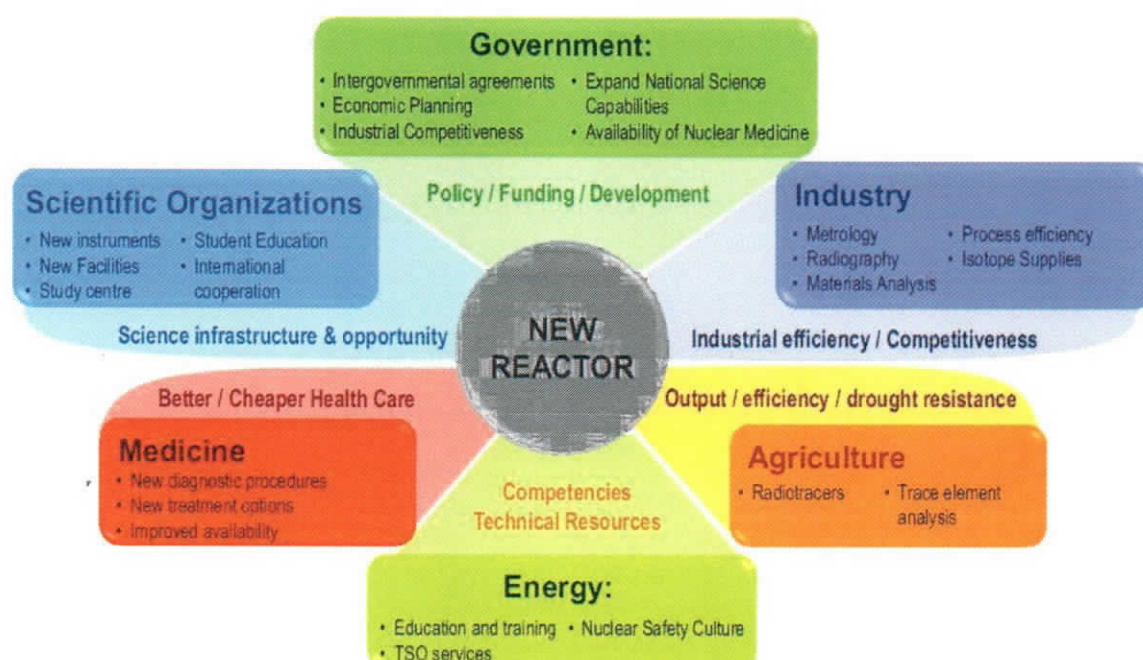
Most of the 240 nuclear reactors operating in 56 countries in the world² are located within the premises of universities and research organizations. The proposed F/S is therefore expected to be conducted on similar locations and will largely depend on the results of the site evaluation. It may also be viable for the consultants to use as reference the information that has been acquired in identifying the site for the Philippine Nuclear Power Plant-1 (PNPP) in Morong, Bataan.

4.1.5. Target Group and Beneficiaries

A schematic diagram illustrating the target groups and potential beneficiaries of the proposed study for the RR is shown in the figure below³. The figure also shows how each group can benefit from the RR.

² Research Reactors by the World Nuclear Association (Accessed online 28 May 2015, at <http://www.world-nuclear.org/info/Non-Power-Nuclear-Applications/Radioisotopes/Research-Reactors/>)

³ Specific Considerations and Milestones for a Research Reactor Project (Pub.1549). — Vienna : IAEA Nuclear Energy Series, ISSN 1995-7807 ; No. NP-T-5.1, 2012.



4.2. Specific Activities

Activities to be performed for this F/S are detailed in Section 4.1. Corresponding expertise requirements are described in Section 6.1. Involvement of experts in the different activities involved in the study is summarized in the matrix below:

Role (# of Experts)	Required Man-Months	Activity Involvement								
		1.i	1.ii	1.iii	2.i	2.ii	2.iii	2.iv	3.i	
1. Team Leader: Project Manager (1)	9									
2. Deputy Team Leader: Research Reactor Specialist	9									
3. Social Science Specialist (1)	3									
4. Economic/Financial Specialist (1)	3									
5. Nuclear Engineer (1)	3									
6. Mechanical Engineer (1)	3									
7. Physicist (1)	2									
8. Geologist (1)	2									
9. Nuclear Legal/ Regulatory Framework Specialist (1)	2									

Tasks are numbered as follows:

1. Preliminary Assessment
 - i. Identify potential stakeholders and quantify stakeholder needs.
 - ii. Evaluate public perception and the corresponding challenges and opportunities.
 - iii. Evaluate the most beneficial range of RR applications that will best address the country's needs.

2. Techno-Economic Evaluation
 - i. Develop the outline facility specification.
 - ii. Identify and evaluate potential sites for the RR.
 - iii. Identify personnel requirement.
 - iv. Analysis of the economic and financial viability.
3. Policy and Organizational Framework Evaluation
 - i. Identify and evaluate existing policy and organizational issues

5. TIMELINES AND DELIVERABLES

5.1. Commencement Date and Period of Implementation

The Study shall be completed within a period of **nine (9) months**, commencing from the date of receipt of the Notice to Proceed (NTP). Refer to **Annex A** for the table of activities /expected outputs.

5.2. Table of Deliverables

A detailed Work and Financial Plan (WFP) shall be submitted by the Consulting Firm to DOST-PNRI for review (copy furnished NEDA for monitoring purposes and payment processing) within five (5) working days from the date of commencement as indicated in NTP.

The deliverables for the subject study as enumerated below shall be submitted by the Consultants in four (4) hard copies to DOST-PNRI for review and two (2) hard copies to NEDA for monitoring purposes and payment processing. An electronic/soft copy shall also be submitted to DOST-PNRI and NEDA.

<i>Deliverables</i>	<i>Timeline</i>
Inception report, WFP	One (1) month from receipt of NTP
Monthly Progress Reports	Monthly until the end of the ninth (9 th) month (excluding the 5 th month), within seven (7) calendar days from end of agreed month-period
Public Perception Survey/Stakeholder Consultation with Assessment and Communication Plan	Second (2 nd) to Fourth (4 th) month from receipt of NTP
Interim Report	Fifth (5 th) month from receipt of NTP
Draft F/S Report: Pre-Project Assessment Report (PPAR)	Eighth (8 th) month from receipt of NTP
Final F/S Report: Pre-Project Assessment Report (PPAR) with presentation	30 calendar days after receipt from DOST-PNRI of the evaluation/comments but not more than nine (9) months from receipt of NTP

- 5.2.1.** The Inception Report and WFP, which shall be submitted to DOST-PNRI for approval, shall include the detailed program for the scope of work involved in the

study, a detailed schedule for all work, including field work related to applicable tasks.

The Inception Report shall also include the fulfilment of the study conditions listed in this TOR as well as approaches and methodologies to be utilized in the development of the study.

- 5.2.2.** The Monthly Progress Reports shall include updates on the physical and financial accomplishments of each of the activities under the WFP, including the difficulties encountered and measures taken to overcome them.
- 5.2.3.** The Interim Report shall include the result of the Preliminary Assessment (Refer to Item 4.1.1), as well, as the status of implementation of the study, in relation to the scope of work.
- 5.2.4.** The Pre-Project Assessment Report (PPAR) shall be submitted within 30 calendar days after receipt from DOST-PNRI of the evaluation/comments on the Draft Pre-Project Assessment Report (PPAR). The report should contain the details related to the project as described in Section 4 of this TOR, including among others:
- PPAR requirements and activities performed;
 - Project description in terms of rationale, objectives, scope, and limitations;
 - Finalized project costs and financing plans;
 - Finalized facility specification and site selection;
 - Project Implementation including implementation arrangements, personnel requirement, and schedule
 - Project justification including analysis of environmental impact and social dimensions, and potential risks; and
 - Alternative design/technology.

6. EXPERTISE REQUIREMENTS and QUALIFICATIONS

The F/S shall be undertaken by a Consulting Firm composed of the following key experts, whose minimum qualifications are stated herein and in Annex B of this TOR.

6.1. Key Experts

6.1.1. Team Leader: Project Management Specialist

- The Team Leader/ Project Management Specialist should have at least a Master's degree in Nuclear Engineering, Physics, Chemistry or related technical discipline such as Mechanical or Chemical Engineering with at least ten (10) years of related experience on project management in nuclear science and technology. It is preferable that the team leader is familiar with all areas of potential RR utilization.
- The tasks of the team leader shall include, but is not limited to, the following:
 - Prepare a general WFP for the conduct of the F/S;
 - Supervise and coordinate all activities of the Consulting Team;

- Submit the work plan and shall inform of any changes or variations; and
- Attend meetings and submit reports and other documents as required by NEDA and/or DOST-PNRI.

6.1.2. Deputy Team Leader: Research Reactor Specialist

- The Deputy Team Leader should have at least a Bachelor's degree in Nuclear Engineering, Physics, or related technical discipline in Basic or Applied Sciences and Engineering with at least five (5) years of previous experience in project management and/or conducting feasibility study of similar nature.
- It is preferable if the Deputy Team Leader already had previous work experience in nuclear science and technology.
- The tasks of the Deputy Team Leader shall include, but is not limited to, the following:
 - Provide assistance to Team Leader in the overall supervision of the various assessment study activities.
 - In the absence of the Team Leader, assume full responsibility including leadership of the Consulting Team.

6.1.3. Social Science Specialist

- The Social Science Specialist should have at least a Bachelor's degree in Social Science or related discipline with at least five (5) years previous experience in evaluating stakeholders.
- In addition, the Social Science Specialist should have experience in conducting feasibility studies of at least two (2) projects of relevant nature.
- The tasks of the Social Science Specialist shall include, but is not limited to, identification of stakeholders, assessment of their corresponding needs and justification of an RR.

6.1.4. Economic/Financial Specialist

- The Economic/Financial Specialist should have at least a Bachelor's degree in Business Management or Finance or related discipline with at least five (5) years of professional experience.
- In addition, the Economic/Financial Specialist should have professional experience in nuclear economics and should have experience in conducting feasibility studies of at least two (2) projects of relevant nature.
- The tasks of the Economic/Financial Specialist shall include, but is not limited to, rationale of the RR, and conduct of economic and financial evaluation of the study, and prepare reports on financial/economic components of the study.

6.1.5. Nuclear Engineer

- The Nuclear Engineer should have at least a Master's degree in Nuclear Engineering or related technical discipline such as Mechanical, Electrical, or Chemical Engineering with at least three (3) years of previous RR projects, RR utilization, RR engineering support and/or RR facility management.
- It is preferable if the Nuclear Engineer already had previous experience in conducting feasibility studies of relevant nature.

- The tasks of the Nuclear Engineer shall include, but is not limited to, providing recommendations in the development of the outline facility specification, including project costs component of the study; and identification of personnel requirement.

6.1.6. Physicist

- The Physicist should have at least a Master's degree in Nuclear Physics or related technical discipline such as Materials Science Engineering and Chemical Engineering with at least five (5) years of research and project management experience of a relevant nature.
- It is preferable if the Physicist already had previous knowledge in nuclear science and technology.
- The tasks of the Physicist shall include, but is not limited to, providing recommendations in the development of the outline facility specification and identification of personnel requirement.

6.1.7. Geologist

- Geologist should be a Licensed Geologist with a Bachelor's degree in Geology and with at least five (5) years of related professional experience, preferably with at least three (3) projects in the geological investigation of relevant projects.
- It is preferable if the Geologist already had previous experience in conducting feasibility studies of a relevant nature.
- The tasks of the Geologist shall include, but is not limited to, evaluation of potential RR sites and overseeing the Surface Investigation and Ecological Survey of the shortlisted site.

6.1.8. Mechanical Engineer

- Should be a Licensed Mechanical Engineer and have at least a Master's degree in Mechanical Engineering with at least five (5) years of professional experience and at least three (3) projects related to RR construction.
- It is preferable if the Mechanical Engineer already had previous experience in conducting feasibility studies of a similar nature.
- The tasks of the Mechanical Engineer shall include, but is not limited to, providing recommendations in the development of the outline facility specification.

6.1.9. Nuclear Legal/ Regulatory Framework Specialist

- The Nuclear Legal/ Regulatory Framework Specialist should have a Bachelor's Degree in Natural Science, Engineering, Law, Political Science or other relevant field with at least ten (10) years of professional experience and at least three (3) projects related to nuclear regulations.
- It is preferable if the Specialist is familiar with the existing nuclear legal and regulatory framework in the Philippines, has previous experience in conducting feasibility studies and/or project management of a relevant nature, and must have knowledge in the requirements and regulations for nuclear reactors/installations programs.

The tasks of the Nuclear Legal/ Regulatory Framework Specialist shall include, but is not limited to, the identification of long-term government commitments and policy issues

Note: Any of the experts must be knowledgeable on Value/Option Analysis concepts.

6.2. Selection Criteria for Short listing

The prospective Consultancy Firms shall be evaluated based on their previous engagements/contracts related to this TOR and rated based on the criteria as shown in Annex B (Rating Table for the Shortlisting of the Consulting Firms) and as summarized below:

- 6.2.1.** Applicable Experience of the Firm (within the past 15 years);
- 6.2.2.** Qualification of Officer, Key Organic Personnel who may be assigned to the Study; and
- 6.2.3.** Job Capacity.

Prospective bidders are required to submit the following:

- a) For the Consulting Firm:
 - List of completed (with Certification) and ongoing related F/S and/or Project Management conducted within the past 15 years;
 - Company Profile; and;
 - Curriculum Vitae (CV) of Key Experts highlighting their relevant work experience.
- b) For the Team and Assistant Team Leaders:
 - Sworn statement of their role in a relevant F/S and/or Project Management, exact duration they have worked on said F/S and brief description of the task they have carried out.

In case of foreign Consultants, they are hereby advised to refer to the Implementing Rules and Regulations (IRR) of Republic Act (RA) No. 9184, otherwise known as the Government Procurement Reform Act (GPRA), for rules regarding their participation in the bidding process.

Note: Similar contracts are those for the conduct of pre-F/S, F/S for projects under the nuclear research reactor sub-sector. Relevant contracts, on the other hand, are those for the conduct of pre-F/S or F/S for projects of a different nature/type but under the nuclear science and technology sector. Detailed engineering, consultancy services, project management, advisory services and/or other kinds of study outside of a pre-F/S or F/S, for the same nature/type of project under the same sector, are also considered "relevant".

6.3. Selection Criteria for Bidding

The Shortlisted Firm shall be required to submit their Technical and Financial Proposals. Bids shall be evaluated using the Quality-Cost Based Selection/Evaluation (QCBS/QCBE) procedure under the GPRA and its IRR and shall be based on the following criteria: eighty percent (80%) Technical Proposal and twenty percent (20%) Financial Proposal.

7. SOURCE OF FUNDS

Funds for the conduct of subject study shall be sourced from NEDA-administered F/S Fund.

8. INSTITUTIONAL SET-UP/ RESPONSIBILITIES

8.1. Executing Agency/ NEDA

- 8.1.1. Shall be the Executing Agency (i.e., representative of the Government in the Contract Agreement with the Consulting Firm);
- 8.1.2. Shall, through its NEDA Bids and Awards Committee (NBAC), be responsible for facilitating the bidding and tendering of the consultancy services in compliance with RA No. 9184 and its IRR with DOST-PNRI as the end-user;
- 8.1.3. Shall be responsible for the disbursement of the fund for the conduct of the F/S once the contract becomes executed; and
- 8.1.4. Shall be responsible for the preparation and submission of financial reports as required by the Department of Budget and Management (DBM) and other reportorial requirements regarding the F/S Fund administration.
- 8.1.5. Shall evaluate, in accordance with DOST-PNRI, all request for payments/billings and determine the acceptability/correctness of the same;
- 8.1.6. Shall have the option to detail counterpart technical personnel to the project for the purpose of on-the-job capacity building/technology transfer; and
- 8.1.7. Shall provide, upon the request of the Consulting Firm, available information/data and also, if available, copies of previous related studies subject to the execution of the Non-Disclosure Agreement, if necessary.

8.2. Implementing Agency / DOST-PNRI

- 8.2.1. Shall be the beneficiary/ end-user of the consultancy services;
- 8.2.2. Shall be responsible for contract implementation and management, including ensuring the quality of outputs. Further, DOST-PNRI, in coordination with NEDA, shall be responsible for the monitoring and evaluation of the progress of the study and approval of reports to ensure delivery of outputs as specified in Sections 2, 4 and 5 of this TOR;
- 8.2.3. Shall provide the necessary counterpart staff to assist project consultants in conducting the services;
- 8.2.4. Shall provide assistance in coordination with other agencies related to the study;
- 8.2.5. Shall provide office space, if necessary, to the consultants during the conduct of the study;
- 8.2.6. Shall provide, upon the request of the Consulting Firm available information/data and also, if available, copies of previous related studies subject to the execution of the Non-Disclosure Agreement, if necessary;
- 8.2.7. Shall evaluate and endorse to NEDA the acceptability and correctness of the deliverables and request for payment/billing statements, within 7 calendar days from the receipt thereof, for the purposes of fund release/payment to the Consulting Firm.

8.3. Consulting Firm

- 8.3.1.** Shall be responsible for the conduct of the study and the timely delivery of results/outputs as indicated under Sections 2, 4 and 5 of this TOR;
- 8.3.2.** Shall be responsible for the provision of the necessary office space which shall be within close proximity to NEDA or DOST-PNRI, for their project staff as well as the Government's detailed personnel including the necessary office equipment (i.e. computers, printers, office supplies, etc.) for the conduct of the study. All equipment procured or used in the development of the project shall be transferred to the Government at the end of the project;
- 8.3.3.** Shall shoulder all expenses required in the conduct of the study, including travel costs and lodging of detailed Government personnel during field visits, except for their salaries;
- 8.3.4.** Shall (a) carry out the services with sound engineering theories and practices to ensure that the final works will provide the most economical and feasible development for the study, (b) accept full responsibility for the consulting services to be performed under this TOR for which the Consulting Firm is liable to DOST-PNRI, (c) perform the work in an efficient and diligent manner and shall use its best effort to keep reimbursable costs down to the possible minimum without impairing the quality of the services rendered, and (d) comply with, and strictly observe any laws regarding workmen's health and safety, workmen's welfare, compensation for injuries, minimum wage, hours of labor and other labor laws;
- 8.3.5.** Shall (a) keep accurate and systematic records and accounts in respect of the services in such form and detail as is customary and sufficient to establish accurately that the costs and expenditures under this TOR have been duly incurred, and (b) permit the duly authorized representatives of the Government from time to time to inspect its records and accounts as well as to audit the same;
- 8.3.6.** Shall not assign nor sub-contract any part of the professional engineering services under this TOR to any person or firm, except with prior written consent of NEDA/DOST-PNRI. The approval by the Government to the assignments of any part of said services or to the engagement by the Consulting Firm of sub-contractors to perform any part of the same shall not relieve the Consulting Firm of any obligations under this TOR;
- 8.3.7.** Shall, during or after the conclusion or termination of the study, limit its role under the project to the provision of the services and hereby disqualifies itself and any other contractor, consulting engineer or manufacturer with which it is associated or affiliated, from the provision of goods and services other than the services herein, except as NEDA/DOST-PNRI may otherwise agree;
- 8.3.8.** Shall prohibit full-time foreign staff during his/her assignment under this TOR to engage, directly or indirectly, either in his/her name, or through the Consulting Firm, in any business or professional activities in the Philippines other than the performance of his duties or assignment under this TOR;
- 8.3.9.** Shall not any time communicate to any person or entity any information disclosed to them for the purpose of the services, nor shall the Consulting Firm make public any information as to the recommendations formulated in the course of or as a result of the services, except with the prior consent of NEDA/DOST-PNRI;

- 8.3.10. Shall agree that nothing contained herein shall be construed as establishing or creating between the Government and the Consulting Firm, the relationship of employer and employee or principal and agent, it being understood that the position of the Consulting Firm and anyone else performing the services is that of an independent contractor;
- 8.3.11. Shall hold the Government free from any and all liabilities, suits, actions, demands, or damages arising from the death or injuries to persons or properties, or any loss resulting from or caused by said personnel incident to or in connection with the services under this TOR. The Consulting Firm shall agree to indemnify, protect and defend at its own expense the Government and its agents from and against all actions, claims and liabilities arising out of acts done by the Consulting Firm or its staff in the performance of the services including the use or violation of any copyrighted materials, patented invention, article or appliance; and
- 8.3.12. Shall provide on-the-job capacity building/technology transfer to the Government's personnel detailed to the project.

9. APPROVED BUDGET FOR THE CONTRACT (ABC)

- 9.1. The ABC for the proposed study is **TWENTY FOUR MILLION THREE HUNDRED SIXTY SIX THOUSAND NINE HUNDRED PESOS (PHP 24,366,900.00)** inclusive of all applicable government taxes and charges, professional fees, and other incidental and administrative costs which shall be paid on a reimbursement basis (e.g., travel expenses, communication expenses, office supplies, office space, and other expenses deemed necessary for the project as certified by the Executing Agency). Attached as **ANNEX C** is the breakdown of the ABC.
- 9.2. Please note that this consulting contract shall be a fixed price contract. Any extension of contract time shall not involve any additional cost to the Government.
- 9.3. All equipment, materials, item acquired for the study shall be turned over to NEDA at the conclusion of the study.

10. PAYMENT SCHEMES/ SCHEDULE

- 10.1. The monthly progress reports shall be the basis for payment of reimbursable items. Billing for the *reimbursable items* may be requested not more than once a month based on the *actual expenses incurred* and supported by *official receipts/ documents*.
- 10.2. In the absence of *official receipts/documents* when claiming for *reimbursable costs*, the Consulting Firm may also be allowed to submit a *certification of actual disbursements made under oath*.
- 10.3. Billing for *non-reimbursable items, including professional fees*, shall be in accordance with the following delivery schedule:

<i>Output</i>	<i>Payment Schedule</i>
Upon acceptance of Inception Report, WFP	10%
Upon acceptance of Interim Report	30%
Upon acceptance of Draft F/S Report: Pre-Project Assessment Report (PPAR)	30%

Output	Payment Schedule
Upon acceptance of Final F/S Report: Pre-Project Assessment Report (PPAR) with presentation	30%
Total	100%

- 10.4.** The Consulting Firm may also be allowed to submit its own payment schemes for the remuneration component only subject to compliance with existing regulations/laws.
- 10.5.** An advance payment shall be made to cover mobilization costs, but shall not exceed **FIFTEEN PERCENT (15%) of the contract amount**, subject to the posting of an irrevocable standby letter of credit issued by an entity acceptable to NEDA and of an equal amount to the advance payment. The advance payment shall be repaid by the Consulting Firm by deducting from his subsequent billings/payments such sum as agreed upon during contract negotiations until fully liquidated within the duration of the contract.

11. RETENTION PAYMENT

A retention payment of ten percent (10%) shall be withheld. It shall be based on the total amount due to the Consulting Firm prior to any deduction and shall be retained from every progress payment until fifty percent (50%) of the value of study, as determined by NEDA, are completed. If, after fifty percent (50%) completion, the study is satisfactorily done and on schedule, no additional retention shall be made; otherwise, the ten percent (10%) retention shall be imposed.

The total "retention money" shall be due for release upon approval of the Final Report. The Consulting Firm may, however, request the substitution of the retention money for each progress billing with irrevocable standby letters of credit from a commercial bank, bank guarantees or surety bonds callable on demand, of amounts equivalent to the retention money substituted for and acceptable to NEDA, provided that the project is on schedule and is satisfactorily undertaken. Otherwise, the ten percent (10%) retention shall be made. Said irrevocable standby letters of credit, bank guarantees and/or surety bonds, to be posted in favor of NEDA shall be valid for the duration of the contract.

12. LIQUIDATED DAMAGES

Where the Consulting Firm refuses or fails to satisfactorily complete the work within the specified contract time, plus any time extension duly granted and is hereby in default under the contract, the Consulting Firm shall pay NEDA for liquidated damages, and not by way of penalty, an amount, as provided in the conditions of contract, equal to at least one tenth (1/10) of one (1) percent of the cost of the unperformed portion of the works for every day of delay. Should the amount of liquidated damages reaches ten percent (10%) of the contract amount, NEDA shall, at its own discretion, terminate the contract without prejudice to any further action it may take to recover whatever losses incurred due to non-performance of the Consulting Firm.

To be entitled to such liquidated damages, NEDA does not have to prove that it has incurred actual damages. Such amount shall be deducted from any money due or which may become due the Consulting Firm under the contract and/or collect such liquidated damages from the retention money or other securities posted by the Consulting Firm whichever is convenient to NEDA.

ANNEX A

Implementation Timeline for the Conduct Feasibility Study for the Establishment of a Research Reactor

Activities	M1				M2				M3				M4				M5				M6				M7				M8				M9			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
Project Inception																																				
Preliminary Assessment																																				
1. Identify potential stakeholders and quantify stakeholder needs.																																				
2. Evaluate public perception and the corresponding challenges and opportunities.																																				
3. Rationale on the establishment of an RR																																				
Techno-Economic Evaluation																																				
1. Develop the outline facility specification.																																				
2. Identify and evaluate potential sites for the research reactor.																																				
3. Identify personnel requirement.																																				
4. Analysis of the economic and financial viability.																																				
Interim Report																																				
Policy and Organizational Framework Evaluation																																				
1. Identify long-term government commitments and policy issues																																				
Finalization of reports																																				

Notes:

- The above chart is indicative only and does not preclude the shortlisted Consulting Firms from submitting their own Work Plan and Gantt Chart of Activities as part of their Technical Proposal.

ANNEX B
Criteria for Shortlisting of Consulting Firms

Consulting Firm						
APPLICABLE EXPERIENCE						
<ul style="list-style-type: none"> Completed consulting services of size, complexity and technical specialty comparable to job under consideration, including quality of performance Other completed consulting services related to the job under consideration Known cases of prior performance, including quality of work conforming to obligations and cost of services 	30%					
QUALIFICATION OF PERSONNEL						
<ul style="list-style-type: none"> Qualification of key personnel that may be assigned to the job 	50%					
JOB CAPACITY						
<ul style="list-style-type: none"> Absorptive capacity to do additional works other than those currently being undertaken 	20%					

ANNEX C

<i>Conduct of Feasibility Study for the Establishment of a Research Reactor (RR)</i> Breakdown of the Approved Budget for the Contract (ABC)	
A. REMUNERATION	18,137,250.00
<i>EXPERTS</i>	
A.1 Team Leader: Project Management Specialist	
A.2 Deputy Team Leader: Research Reactor Specialist	
A.3 Social Science Specialist	
A.4 Economic/Financial Specialist	
A.5 Nuclear Engineer	
A.6 Mechanical Engineer	
A.7 Physicist	
A.8 Geologist	
A.9 Nuclear Legal/ Regulatory Framework Specialist	
<i>SUPPORT STAFF</i>	
A.10 Administrative Staff	
A.11 Data Encoder	
B. REIMBURSABLE EXPENSES	6,229,650.00
B.1 Field visits (room costs, subsistence allowance and other similar field expenses)	
B.2 Field travel expenses (airplane fare, vehicle rental, airport fees and taxi fares)	
B.3 Other cost (office equipment and furniture, office running cost such as office supplies, sundries/communication, reproduction of documents, consultation meetings/ representation expenses, office space and utilities)	
B.4 Site characterization/ evaluation	
B.5 Socioeconomic surveys and investigations	
GRAND TOTAL	24,366,900.00