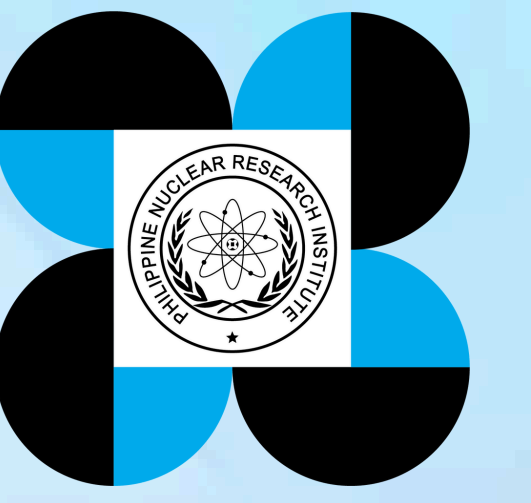




THE PHILIPPINES' NUCLEAR FUEL CYCLE RESEARCH AND DEVELOPMENT PROGRAM



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ABSTRACT

The Philippine government has included nuclear energy in the country's energy mix through the Executive Order 164, signed on February 28, 2022. This has signaled the government's commitment to integrate nuclear energy in the country's energy mix. The Department of Science and Technology (DOST) and Philippine Nuclear Research Institute (PNRI) have initiated the Nuclear Fuel Cycle Research Program to develop an effective approach to the nuclear fuel cycle. The program has four projects: Nuclear Materials Exploration and Recovery, Nuclear Reactor Technology Assessment and Development, Strategy for Radioactive Waste Management, and the Establishment of Nuclear Plant Simulator and Analyzer Facility. The study team is composed of scientists, engineers, and researchers from various institutions such as DOST-PCIEERD, PNRI, University of the Philippines Diliman, and other government agencies funded through the DOST Grants-in-Aid Funds. The program aims to ensure reliable electricity production from nuclear power by exploring uranium deposits, assess existing nuclear reactor technologies, establishing a nuclear plant simulator facility and strategies for nuclear waste management. The research findings will support policy development and the implementation of the nuclear energy program in the Philippines.

BACKGROUND



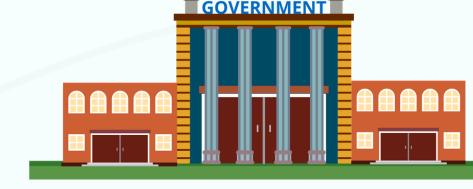
Legal Basis

On February 28, 2022, the Philippine government formalized the inclusion of nuclear energy to the country's energy mix through the Executive Order 164: *Adopting a National Position for Nuclear Energy Program and For Other Purposes*, signaling the commitment to nuclear energy as an alternative baseload power source.



Nuclear Energy Program Inter-Agency Committee (NEPIAC)

NEPIAC was created following the IAEA guidelines. NEPIAC direct studies for adopting the nuclear energy program and support research and development on the nuclear fuel cycle in response to the IAEA Mission Report on Integrated Nuclear Infrastructure Review (INIR) - Phase 1 [IAEA, 2018].



Creation of an Independent Nuclear Regulatory Body

The PHILATOM Bill, currently under senate discussion, will establish the Philippine Atomic Energy Regulatory Authority as an independent nuclear regulatory body.

METHODOLOGY

THE NUCLEAR FUEL CYCLE RESEARCH PROGRAM

Project I: Nuclear Materials Exploration and Recovery (NuMER)

Project II: Nuclear Reactor Technology Assessment and Development (NuRAD)

Project III: Strategy for Radioactive Waste Management (STRAW)

Project IV: Establishment of Nuclear Plant Simulator and Analyzer Facility for R&D and Capacity Building for the Philippine Nuclear Energy Program (NuSIM)

Project 1: Nuclear Materials Exploration and Recovery (NuMER)

Component 1: Exploration Targeting for Nuclear Materials

Component 2: Lab-scale U extraction/ yellow cake production

Component 3: Uranium Mining in seawater

Component 4: Nuclear Material Isotopes Method Development and Measurement in Cores and Environment

front-end of cycle

Project II: Nuclear Reactor Technology Assessment and Development (NuRAD)

Component 1: Radiological Impact Assessment (RIAS) baselining and policy formation

Component 2: Accelerator-driven subcritical nuclear reactor (ADSuN) design and development

Component 3: Reactor Technology Assessment

Project IV: Establishment of Nuclear Plant Simulator and Analyzer Facility for R&D and Capacity-building for the Philippine Nuclear Energy Program 

operations

Project III: Strategy for Radioactive Waste Management (STRAW)

Component 1: RadWASTE and NPP/SMR siting for updating PNRI Regulations

Component 2: Timescales of volcanic activities near NPPs and RadWaste Facilities

Component 3: Technology selection for predisposal management of low and intermediate level radioactive waste from NPP operations

back-end of cycle

CONCLUSION

All four projects are independent, with each one's outputs significantly affecting the others. For instance, the indigenous uranium sources, and extraction technologies developed by Front-End (Project I - NuMER) must align with the reactor technology identified by Operations (Project II - NuRAD). This, in turn, impacts the radioactive waste sites and technologies developed by Back-End (Project III - STRAW). Project IV will establish a Nuclear Power Plant Simulator and Analyzer System at the Philippine Nuclear Research Institute for training and research. The Research Program Implementation will start from 01 July 2024 to 30 June 2026. The joint ICTP-IAEA INPRO School on Strategic Planning for Sustainable Nuclear Energy will provide valuable inputs in improving the Nuclear Fuel Cycle Program of the Philippines.

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