The Lab Building Project

Addressing global developmental challenges by providing solutions for climate resilience and environmental management.

The ReNuAL Initiative - Rising to the Climate Challenge

The IAEA expects to complete construction by the end of 2024 on a second new laboratory building of a "flexible modular lab" (FML2) design to serve as home for 3 of its 12 nuclear applications (NA) laboratories. The 12 NA laboratories support the IAEA's work in delivering to Member States the benefits of peaceful nuclear technologies through training, services, and applied research in food and agriculture, human health and environmental resource management.

Provisionally called "FML2", the new laboratory building will house the Terrestrial Environment Laboratory, the Plant Breeding and Genetics Laboratory, and the Nuclear Science and Instrumentation Laboratory. While these laboratories provide support on a range of developmental challenges (see overleaf), they are central to the IAEA's work helping Member States build resilience and manage environmental resources in response to a changing climate, among the greatest challenges of our time.

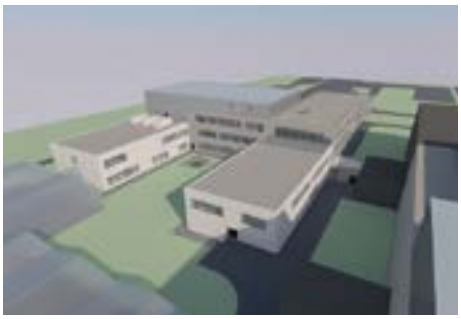
These three laboratories currently operate from cramped quarters, built decades ago and designed for a different scientific era. The new laboratories building will add capacity to keep up with surging demand for services while meeting or exceeding modern safety and environmental standards. The FML design offers lab facilities that are highly functional yet easily adapted to meet evolving future needs.

ReNuAL2: Building for Science

The IAEA has made significant progress in modernizing facilities of its 8 NA laboratories located in Seiberdorf, Austria, which date from the 1960s. The so-called "ReNuAL" initiative has delivered new facilities for five of them, including two new laboratory buildings and a medical linear accelerator facility.

The final project phase, known as ReNuAL2, involves refurbishment of the Dosimetry Laboratory (completed and operational since June 2024) and construction of the FML2 and new laboratory greenhouses, which are both expected to begin operations in mid-2025.

Front view of the Planned FML2



Aerial View of the Planned FML2 and Greenhouses

ReNuAL II

The Three FML2 Labs:

- Provide R&D, training and services available to all IAEA Member States
- Support 5 SDGs

The FML2 Building will:

- Provide increased and enhanced Lab capacities
- Meet or exceed modern safety and environmental standards
- Allow more efficient workflow
- Remain adaptable for future needs

Promoting Climate Resilience and Environmental Management

Terrestrial Environment and Radiochemistry Laboratory (TERCL): provides environmental impact assessments and ensures high quality analytical measurements in Member State laboratories for radioactive, industrial, and other pollution contaminants by providing guidance, reference materials and worldwide proficiency tests. A contaminant of interest is greenhouse gases responsible for climate change. The new FML2 facilities will enable precise quantification of the isotopic composition of greenhouse gases, allowing TERCL to develop guidelines and associated reference materials that enable Member State laboratories to generate reliable and reproducible long term isotopic data of greenhouse gases across the globe. The new FML2 will allow TERCL to meet increasing Member State demands for services, training, and proficiency testing now and into the future.

Plant Breeding and Genetics Laboratory (PBGL): conducts R&D and training on plant mutation breeding and associated biotechnologies for the development of improved crop varieties that are high yielding and resilient to climate change. Innovative functional genomics technologies, trait-specific screening procedures, computational biology/bioinformatics, and newer R&D topics such as gene editing are areas of focus. These technologies are provided to Member States through an average of 20-25 fellowships and about 30 trainees annually. The Laboratory also provides irradiation services for crop seed or plant material to over 20 Member States on average annually. The new FML2 facilities will consolidate PBGL functions into one location, enable efficiencies, and facilitate research in a setting that meets or exceeds modern technology, safety and environmental standards.

Nuclear Science and Instrumentation Laboratory (NSIL): provides expertise, training and support in the effective use of nuclear instrumentation and analytical techniques in a broad range of applications, including mobile radiation monitoring, X ray spectrometry, accelerator technologies, and compact neutron generators. The Laboratory also operates the Nuclear Instrumentation Portal to foster information exchange, coordinates proficiency tests covering diverse analytical techniques, and offers specific training in radiotracers and radiation technology applications. Adaptive research projects in the fields of radiological mapping, air pollution monitoring, cultural heritage, nuclear security, and other areas are tailored to the needs of Member States. The new FML2 facilities will allow for modernization of instrumentation and expansion of training opportunities.

The ReNuAL Impact: Stories from the Field

Airborne Particulate Matter (APM) is known to increase the incidence of several respiratory diseases. The Nuclear Sciences and Instrumentation Laboratory has supported regional technical cooperation projects in all continents to introduce and expedite non-destructive multielement analysis of the APM. Projects involving 95 collection stations in 86 countries are enhancing knowledge of air pollution by compiling a global database of APM concentration, composition and sources.

Jamaica's status as a leading producer of ginger has been under threat from the rhizome rot disease, which causes yield losses in the range of 50–90% in some areas. With technical support from the Joint FAO/IAEA Centre of Nuclear Techniques in Food and Agriculture and training of research scientists at the PBGL, a mutation breeding programme undertook laboratory and greenhouse-based screening of over 120 mutant lines of ginger that identified lines with high levels of disease resistance.