Overview of CNCAN regulatory activities and role in nuclear educational and training programmes

PLANNING AND IMPLEMENTATION

OF INTEGRATED NUCLEAR EDUCATION ADVISORY SERVICES

IAEA, INEAS Mission – Romania

18-21.11.2025

Bucharest, UNSTPB, University Library, Council Room

NATIONAL COMMISSION FOR NUCLEAR ACTIVITIES CONTROL

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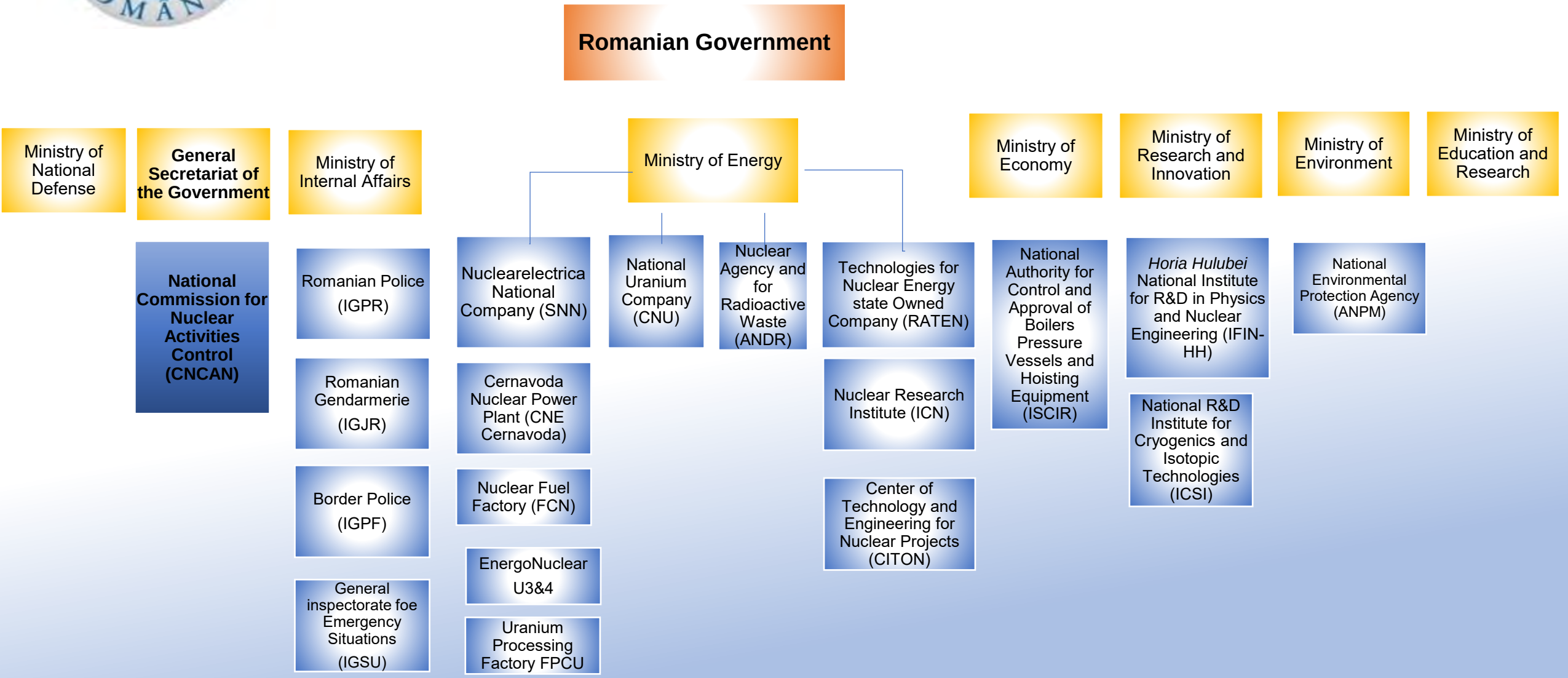
- CNCAN Policy and Strategy for ensuring and maintaining the adequate competence of CNCAN staff 2025 – 2030

About us

- ✓The main Romanian Laws governing the nuclear facilities and activities are:
  - ✓Law no. 111/1996 on the Safe Deployment, Regulation, Licensing and Control of Nuclear Activities, republished, with subsequent modifications and completions
  - ✓Law no. 703/2001 on the Civil Liability for Nuclear Damage, published in Official Gazette, no. 818/19.12.2001
  - ✓National Strategy on Nuclear Safety and Security (*Strategia naţionala de securitate şi siguranţă nucleară*), approved by Government Decision no. 600/2014
- ✓In addition, we need to respect international legislation such as international conventions and treaties in the nuclear field, the Euratom Treaty and the EU regulations and directives applicable to nuclear activities. All these provisions have been transposed in the national legislation.

About CNCAN

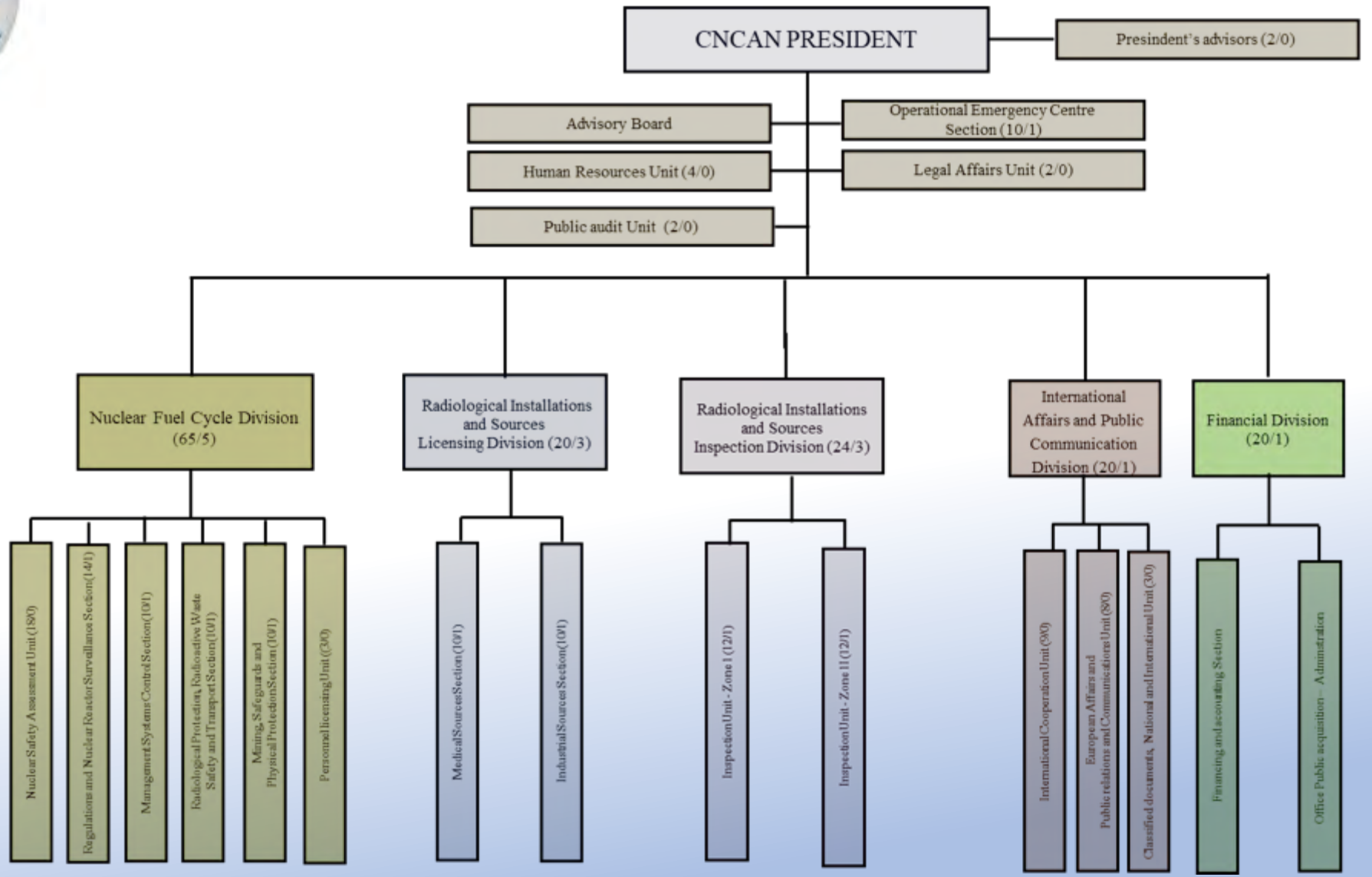

Romanian Government
Ministry of National Defense
General Secretariat of the Government
Ministry of Internal Affairs
Ministry of Energy
Ministry of Economy
Ministry of Research and Innovation
Ministry of Environment
Ministry of Education and Research
National Commission for Nuclear Activities Control (CNCAN)
Romanian Police (IGPR)
Romanian Gendarmerie (IGJR)
Border Police (IGPF)
General inspectorate foe Emergency Situations (IGSU)
Nuclearelectrica National Company (SNN)
National Uranium Company (CNU)
Nuclear Agency and for Radioactive Waste (ANDR)
Technologies for Nuclear Energy state Owned Company (RATEN)
Cernavoda Nuclear Power Plant (CNE Cernavoda)
Nuclear Fuel Factory (FCN)
EnergoNuclear U3&4
Uranium Processing Factory FPCU
Nuclear Research Institute (ICN)
Center of Technology and Engineering for Nuclear Projects (CITON)
National Authority for Control and Approval of Boilers Pressure Vessels and Hoisting Equipment (ISCIR)
Horia Hulubei National Institute for R&D in Physics and Nuclear Engineering (IFIN-HH)
National R&D Institute for Cryogenics and Isotopic Technologies (ICSI)
National Environmental Protection Agency (ANPM)

About us

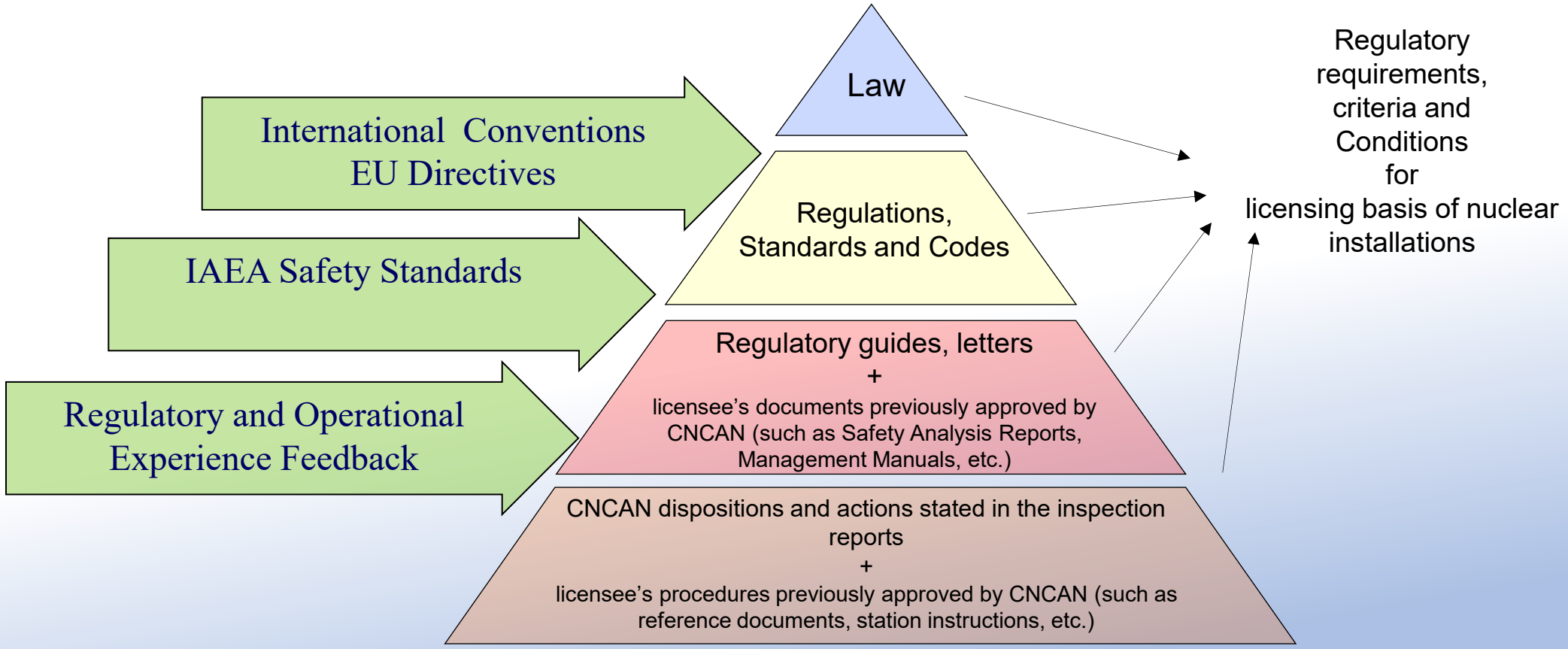
- ✓The National Commission for Nuclear Activities Control (CNCAN) is the national competent authority responsible for the regulation, licensing and control in the nuclear field, for all nuclear activities and installations within Romania
- ✓CNCAN is under the subordination of the Government and in the coordination of the Prime Minister, through the General Secretariat of the Government
- ✓CNCAN has all the necessary legal powers to issue mandatory regulations, to issue licenses for nuclear facilities and activities and to perform safety evaluations, inspections and enforcement
- ✓CNCAN has the responsibility to ensure, through the regulations issued, the licensing process and the dispositions arising from the control procedures (review and assessment, inspection and enforcement), that an adequate framework is in place for the safe deployment of nuclear activities

182 job positions, excluding the President

Organizational arrangements



Regulatory framework



About us

The Law no. 111/1996 empowers CNCAN to provide a regulatory framework and enforce the regulations by issuing licenses and perform regulatory oversight on

- ✓ Nuclear safety;
- ✓ Radiological protection;
- ✓ Quality management systems;
- ✓ Nuclear safeguards / Non-proliferation of nuclear weapons;
- ✓ Physical protection of nuclear facilities and materials;
- ✓ Transport of nuclear and other radioactive materials;
- ✓ Management of radioactive waste and spent nuclear fuel;
- ✓ Emergency preparedness and response in case of nuclear or radiological accident;
- ✓ Manufacturing of products and supply of services for nuclear and radiological installations.

CNCAN issues

Regulated nuclear activities and installations within Romania

Nuclear installations and activities

- Cernavoda NPP – 2 PHWR Units, CANDU type
  - 2 x 706.5 Gross Capacity MW(e)
- 14 MWt TRIGA-type Material Testing Reactor - operational

- Other major regulated facilities in Romania include:
  Facilities for uranium ore mining, milling and processing;
  Fuel Manufacturing Plant;
  Heavy Water Production Plant – closed, only laboratory still functioning;
  Radioactive Waste Management Facilities.
- Regulated activities: transport of nuclear and radioactive materials
- Manufacturing and supply of services for nuclear safety related items etc.

Radioactive sources and installation

- Over 9000 economical agents licensed by CNCAN for use of ionizing radiation sources
- Over 800 radiological installations for industrial field
- & over 6000 Radiological installations for Medical field
- Around 3000 licenses/registration issued per year
- Over 7000 equipment registered in CNCAN data base

New projects in the Nuclear Sector of Romania

Refurbisment of U1 Cernavoda NPP → Unit shutdown and the effective refurbishment of the project, scheduled to develop during 2027 –2029.

Detritiation Facility (Tritium Removal facility) ← Romania is expected to detritiate its CANDU (Canada Deuterium Uranium) units at Cernavoda, with the goal of improving radiological safety. The authorizations for siting and construction phase were issued by CNCAN in March 2024

U3&U4 of Cernavoda NPP → The last stage of the project consists in resuming construction of civil constructions, construction – installations activities and start-up activities at the site, phase estimated to last 69-78 months. It is estimated that Unit 3 will be commissioned in 2030, with the commissioning of Unit 4 to follow in 2031.

- ✓ Expansion of the Dry storage facility for spent fuel (DICA) with type modules MACSTOR 400. The primary objective of this expansion project is to double the storage capacity, exceeding the existing configuration of MACSTOR 200 modules in order to accomodate the Refurbishment of U1 and the construction of U3& U4 of Cernavoda NPP. → **Dry storage facility for spent fuel (DICA)**

Current new regulatory activities

CANDU Fuel Fabrication Plant (FCN) Pitesti →

Strategic plans to increase the production capacity of the Nuclear Fuel Plant. for the efficient operation of Cernavoda NPP's Units 3&4. The enhanced of 37-element fuel bundle (37M), currently in operation and with the aim to optimize Critical Heat Flux (CHF) performance within ageing pressure tubes.

ALFRED Project ←

Development of the 4th Generation LFR reactor. Pre-licensing Regulatory Cooperation for **EAGLES** – Pilot Project for IAEA NHSI regulatory track cooperation model for multinational pre-licensing; Joint effort of the Belgian, Romanian regulatory authorities with the Italian regulatory body as an observer

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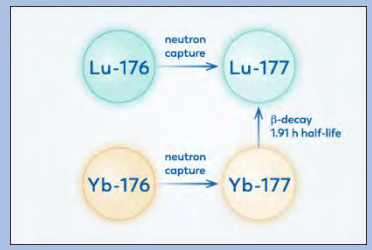
SMRs →

In November 2021, Nuclearelectrica and NuScale Power signed an agreement in order to advance the implementation of the innovative technology of the small modular reactors of NuScale, in Romania, in this decade. The plan is to have 6 modules with an installed capacity of 462 MWe. ***In* August 2023 CNCAN approved the Licensing basis document for NuScale SMR.** In **July 2024** the authorization request was registered with CNCAN

Lu-177 radioisotope production at Cernavodă Unit 2 →

Nuclearelectrica and Framatome have signed an agreement to implement Framatome's technology for the production of Lu-177 radioisotopes at Cernavodă Unit 2.



CNCAN role in nuclear educational and training programmes

Establishing the regulatory framework and oversight of nuclear activities

- CNCAN establishes, through the Nuclear Safety Norms on the selection, training, qualification and authorization of personnel of organizations responsible for the design, siting, construction and assembly, commissioning, operation and decommissioning of nuclear installations, the general requirements applicable to all personnel with functions important to nuclear safety, as provided under Law no. 111/1996 and the related regulatory framework

CNCAN organisational needs and work force requirements

- In accordance with Law 111 / 1996 and the Nuclear Safety Directive adequate resources, both human and financial, have to be available in order for CNCAN to fulfil its mandate
- The technical expertise of CNCAN staff has to cover a wide range of different science and technology curricula

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Knowledge, skills and attitudes - KSAs in basic science and technology

Nuclear Installations Safety

Basic science and technology

Mathematics
Physics
Chemical, electrical, civil and mechanical engineering;
Chemistry, including radiochemistry;
Earth sciences, including geology, seismicity, meteorology, hydrology, etc.;
Computer science;
Nuclear engineering, including nuclear reactor concepts, nuclear physics, reactor physics, etc.;
Environmental engineering;
Materials, metallurgical engineering;
Radiography including medical applications;
Thermodynamics and thermo hydraulics;
Behavioural sciences.

Expected to be learned in university

Applied science and technology

Nuclear reactor and power plant technology;
Research reactor technology;
Nuclear fuel cycle technology;
Nuclear safety technology;
Technologies regarding the application of radiation in industry, research and agriculture;
Medical physics;
Radiation physics, including shielding;
Health physics, radiation protection and naturally occurring radiation;
Environmental sciences;
Management systems, including safety management, safety culture and quality
management.

Expected to be learned during post – graduate studies and/or OJT

Specialized science and technology

Methodologies and analysis:
• Safety assessment methodology;
• Deterministic accident analysis;
• Probabilistic safety analysis;
• Severe accident analysis;
• Reliability analysis;
• Human and organizational factors and human performance;
• Site evaluation;
• Fire analysis and protection systems

Specialized areas:
• Instrumentation and control systems of nuclear installations, including software reliability;
• Criticality safety;
• Materials: including radiation effects on materials, corrosion, corrosion chemistry, etc.;
• Dosimetry.

Additional areas:
• Security, nuclear materials protection, control and accountability;
• Safety in transportation of radioactive material;
• Management of spent fuel and radioactive waste;
• Decommissioning of nuclear installations;
• Industrial safety;
• Radio-ecology.

Expected to be learned during post – graduate studies

Knowledge, skills and attitudes - KSAs in basic science and technology

Radiation Facilities and Activities

Basic science and technology

Physics;
Chemistry;
Earth and Environmental sciences;
Health sciences;
Communication and Social sciences.

Expected to be learned in university

Applied and specialized science and technology

Medical physics;
Radiation or Health physics;
Radiation dosimetry;
Radiochemistry;
Radioecology;
Technologies regarding the application of radiation in medicine, industry, research and agriculture;
Radiology, Radiotherapy, Nuclear medicine;
Mechanical engineering, Civil engineering, Physics engineering;
Safety assessment methodology;
Hazard assessment;
Calibration and Radiation measurement;
Radiation source security;
Safety in transportation of radioactive material;
Management of radioactive waste (e.g. hydrology, geochemistry, geology);
Decommissioning of facilities;
Emergency management;
Human, social and organizational factors, including safety culture.

Expected to be learned during post – graduate studies and/or OJT

POLICY FOR ENSURING AND MAINTAINING THE ADEQUATE COMPETENCE OF CNCAN STAFF 2025 – 2030

Main directions of action

- fulfillment of the CNCAN duties established by law 111/1996 in the nuclear field
- implementation of the provisions of the Nuclear Safety and Security Strategy
- fulfilling the regulation, licensing and control functions in achieving the strategic objectives of the Integrated National Plan in the domain of Energy and Climate Change for the period 2021-2030

POLICY FOR ENSURING AND MAINTAINING THE ADEQUATE COMPETENCE OF CNCAN STAFF 2025 – 2030

Principles

- Developing nuclear safety culture within the organization.
- Establishing an optimal organizational staffing structure.
- Defining the minimum number of positions required for proper operational functioning.
- Ensuring sustainability of personnel costs by maintaining an appropriate technical to support staff ratio.

POLICY FOR ENSURING AND MAINTAINING THE ADEQUATE COMPETENCE OF CNCAN STAFF 2025 – 2030

Establishing the Necessary Competencies in CNCAN

- ✓ Defining the categories and types of functions required, aligned with the complexity of activities.
- ✓ Setting general requirements for executive positions, including:
  - field and duration of specialized studies
  - required seniority in the specialty
  - specific professional requirements
- ✓ Specifying capability requirements for each function category.
- ✓ Setting general requirements for management positions, including:
- ✓ • necessary managerial skills
  • coordination between management and technical responsibilities
- ✓ Defining the method for filling function categories and the associated career development path.

POLICY FOR ENSURING AND MAINTAINING THE ADEQUATE COMPETENCE OF CNCAN STAFF 2025 – 2030

Maintaining and Developing the Necessary Competencies in CNCAN

- ✓ Apply a systematic approach to training.
- ✓ Provide initial training, on-the-job training and continuous training.
- ✓ Support participation in master's and doctoral programs.
- ✓ Support participation in international cooperation programs with organizations such as IAEA and NRC.
- ✓ Preserve institutional knowledge.
- ✓ Document processes through procedures, work instructions and guides.
- ✓ Use mentoring programs involving specialists approaching retirement.

STRATEGY FOR ENSURING AND MAINTAINING THE ADEQUATE COMPETENCE OF CNCAN STAFF 2025 – 2030

Components

Hiring plan for necessary personnel

- annual planning according to organizational needs
- increasing the success rate of recruitment sessions (currently 60%)

Reducing personnel turnover

- ensuring adequate salary levels
- ensuring appropriate working conditions
- providing clear and timely professional development paths
- ensuring diversity of professional tasks

Implementation of annual training programs

- realistic definition of training objectives
- allocation of the necessary training budget

Continuation of international cooperation programs

Balanced distribution of competencies across organizational structures

Professional retraining

Development of multiple competencies through job rotation

STRATEGY FOR ENSURING AND MAINTAINING THE ADEQUATE COMPETENCE OF CNCAN STAFF 2025 – 2030

Constraints

- ✓ The nuclear field represents a narrow labor market segment.
- ✓ Professional knowledge required is highly specialized.
- ✓ Labor market competition is significant.
  - o Salaries offered in the private sector are more attractive.
  - o Recruitment frequently occurs while candidates are still in study programs.
  - o There is reluctance toward working in the public sector.
- ✓ Government legislation imposes restrictions.
  - o Hiring sessions may be suspended.
  - o Personnel cost reductions may be required.


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