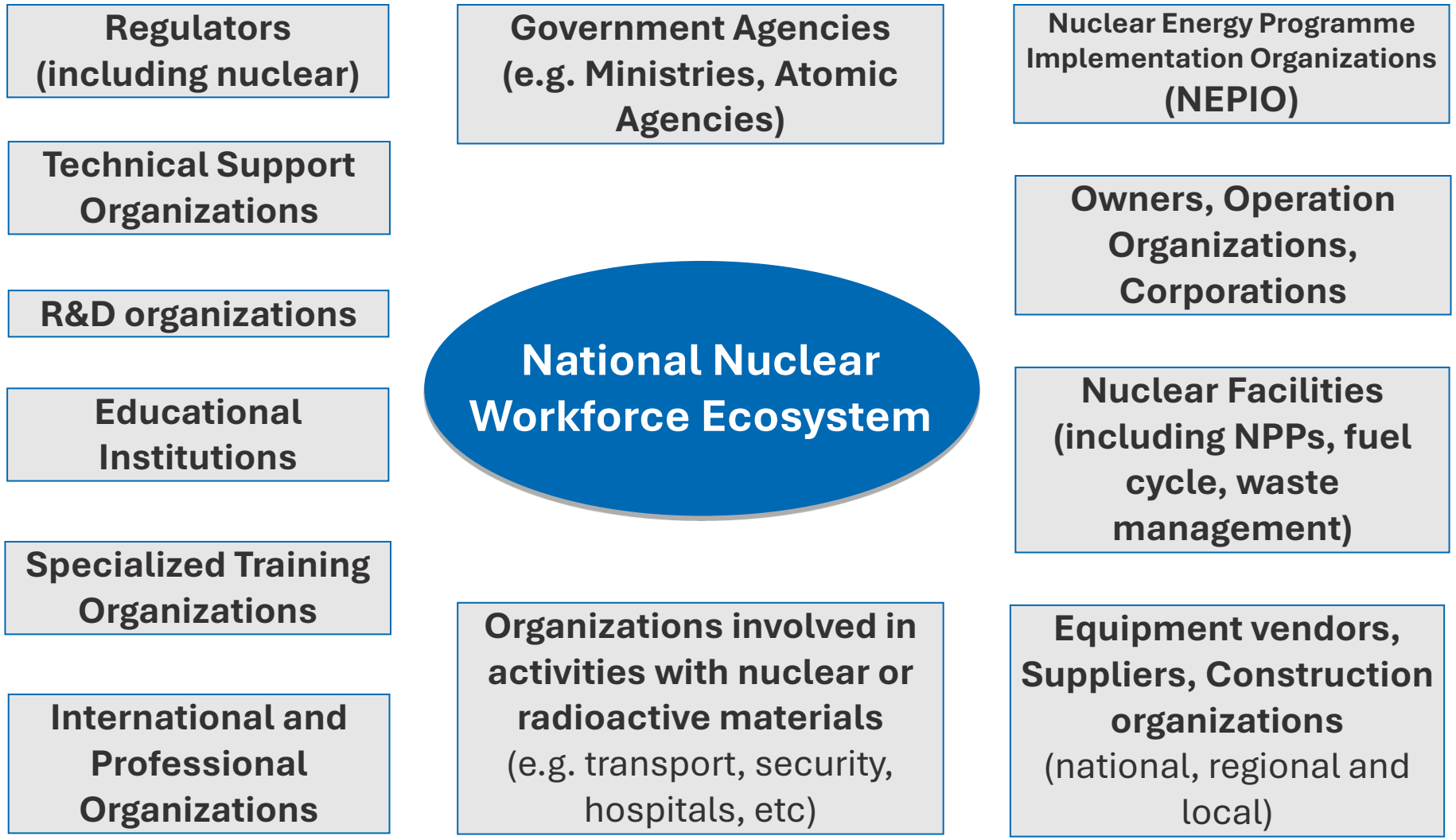
Objectives of the mission and the processes to be used during the week and expected outputs

IAEA INEAS MISSION IN ROMANIA

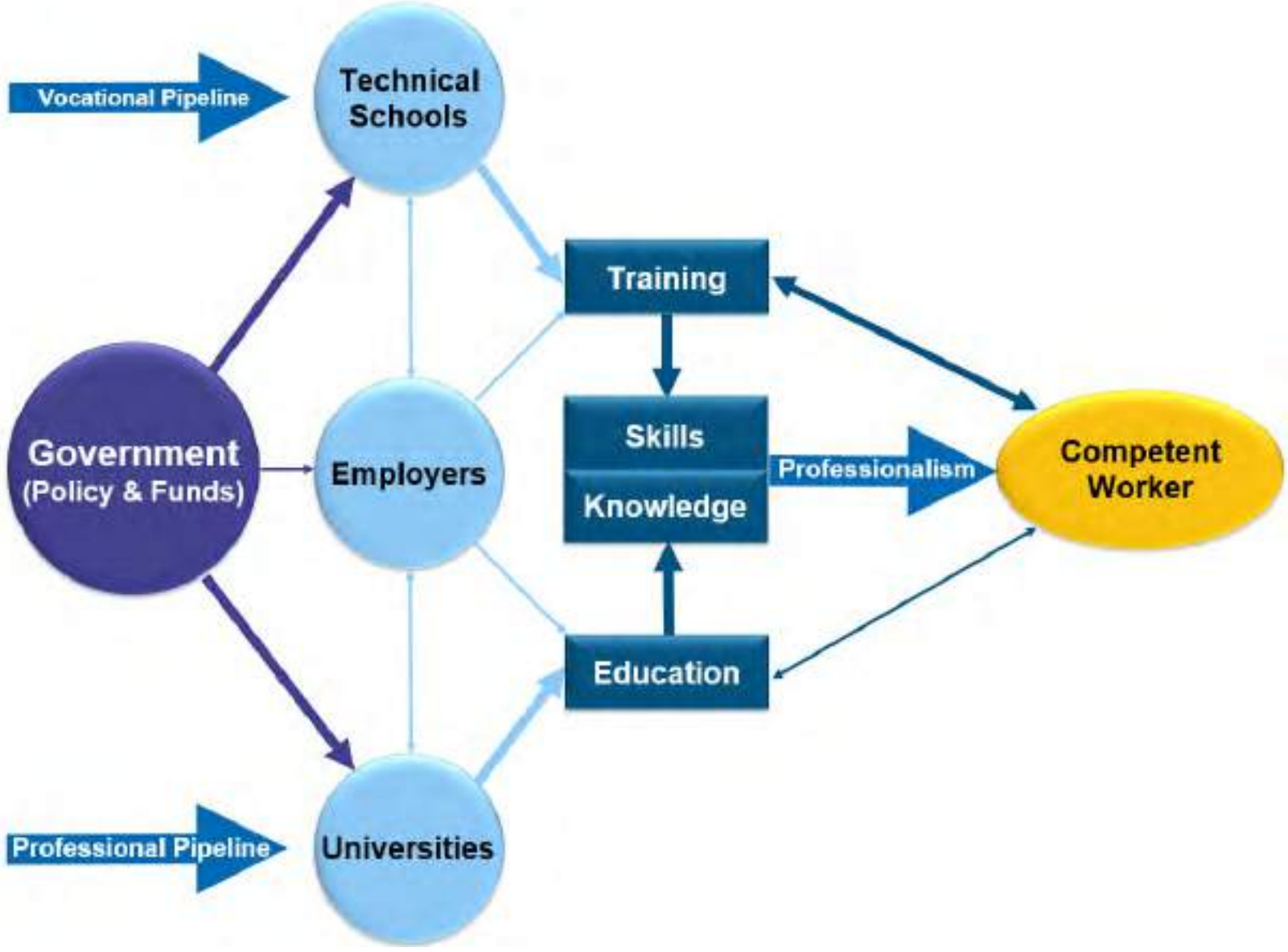
18-21 November 2025

Dr., MBA, Eng., Helena Zhivitskaya, NKMS, IAEA
h.zhivitskaya@iaea.org

National Nuclear Workforce Ecosystem



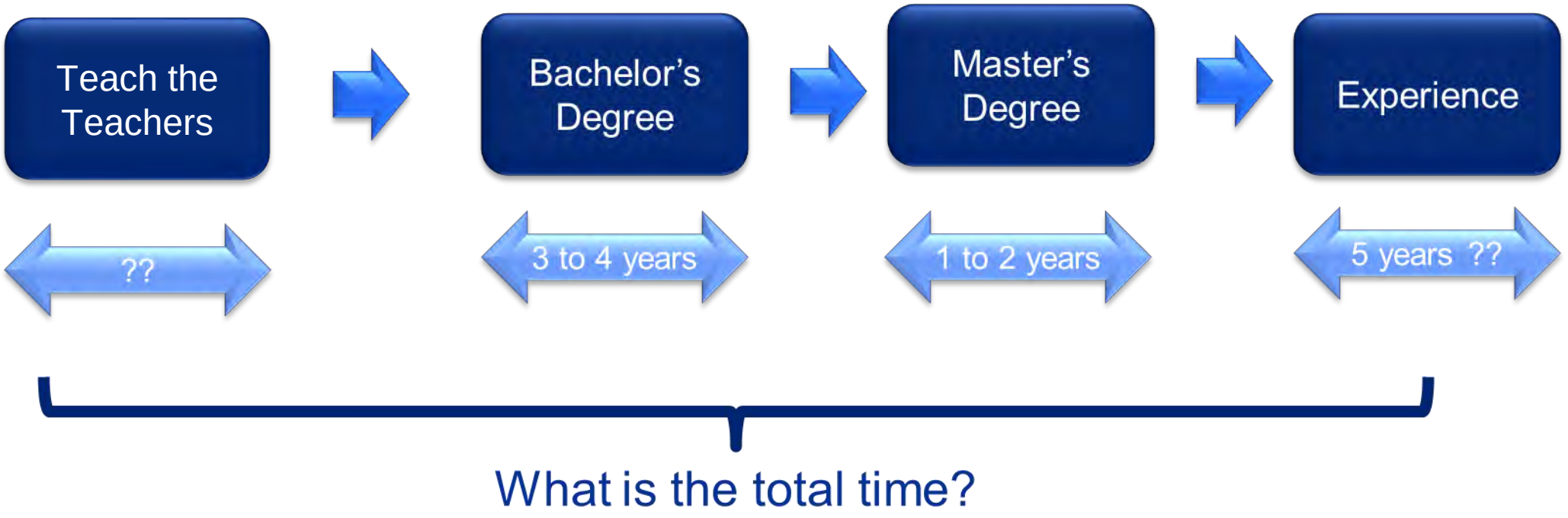
National ecosystem for Capacity Building



The Need for Education

Sustainable educational programmes are an essential component
for the application of nuclear technologies
nuclear energy, industrial, agricultural or medical projects

How long does it take?



How can it be optimized?

Common Challenges Addressed

- A shortage of qualified and experienced personnel with the various skills and competences required for of nuclear energy programmes
- A mismatch and gaps between the specialties of graduates and actual labour market demand
- Ineffectual national policy development, and the absence of a framework for establishing appropriate funding priorities
- Insufficient alignment and coordination of the roles of key stakeholders, such as different government departments and agencies, in understanding and promoting the contribution of nuclear energy towards sustainable socio-economic development.

Objectives

A national INEAS supports the establishment and development of sustainable national nuclear education programmes by:

- Evaluating current capability and analysing existing education programmes to identify strengths and the areas where investment is needed;
- Providing guidance on educational mechanisms, such as networks, that will support and enhance the nuclear education programmes;
- Introducing a series of indicators that monitor the establishment and development of nuclear education programmes.

Integrated Nuclear Education Advisory Services

Designed to:

- Optimise a country's resources and its university education programmes
- Support national objectives through a detailed evaluation of the current capability
- Strategic planning for its short, medium and long-term development

National INEAS

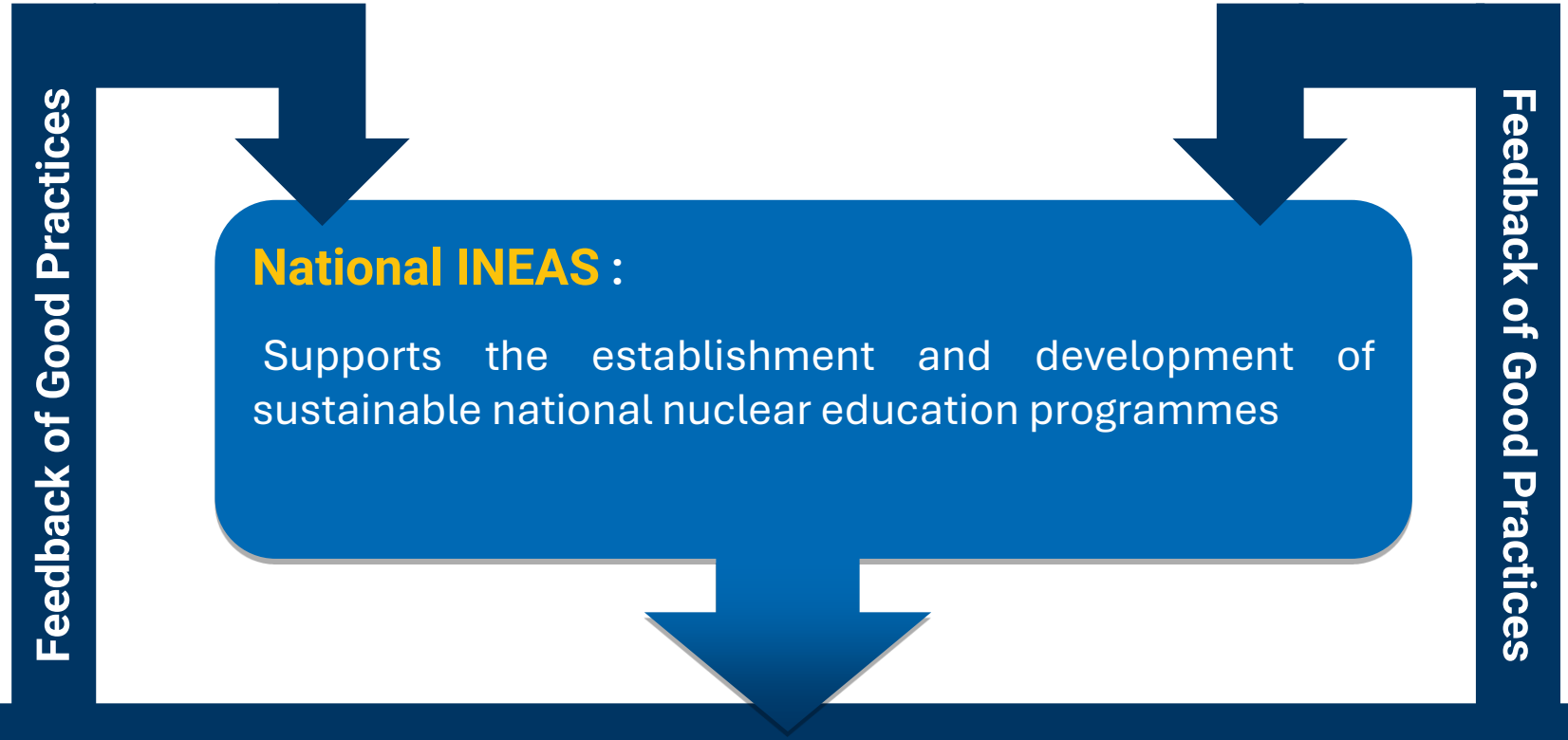
Supports the establishment and development of sustainable national nuclear education programmes

University INEAS

Specific high-level assistance to optimise and enhance nuclear education programmes to ensure their sustainability

Also used to share good practices

Integrated Nuclear Education Advisory Services



University INEAS : Programme appraisal to include specific high-level assistance to optimise and enhance existing nuclear education programmes to ensure their sustainability. Also used to identify good practices at universities.

Three Phases of National INEAS

Phase I Assessment of the current nuclear education resources and capabilities

Phase II Develop a strategy to deliver the required nuclear education programme(s)

Phase III Produce national indicators for monitoring and evaluating progress

Sustainability Factors

- Internal University Factors
  - Policy
  - Staff resources
  - Outreach programmes

- External Factors
  - Social acceptance
  - Development of nuclear and radiological technologies
  - Government policy
  - Career development

National INEAS Implementation

- The aim is **not** to give a pre-prepared answer
- The aim is to ask questions and provide answers based on the experience in the room
- Provide a framework and guidance for the assessment and planning of sustainable national educational programmes
- The success is directly correlated to the number of participating organisations

National INEAS Objectives

- Improve the understanding of the strategic importance, shared responsibility, and specific challenges to establishing a sustainable nuclear education programme
- Discuss common concerns, issues and challenges related to the institutional coordination for the nuclear education programmes at national level, to leverage resources and build capability
- Assess the present status of nuclear education in the universities
- Outline the achievable status of nuclear education in the universities with the resources available
- Provide a detailed workplan to achieve the improved status

Phase I - Self-assessment

- Understand the strengths and weaknesses of the national programmes
- Identify the level of collaboration and cooperation between government, education and employers
- Identify areas for growth, the barriers that need to be overcome and the enablers that support growth
- Identify and summarize all the internal and external factors that influence the nuclear education programmes

Preliminary Survey

- What are the government's priorities for nuclear science and technology?

- What are the existing policies and strategies governing nuclear, science and technology?

- What is the national demand for nuclear specialists?
- What kinds of specialist are needed?
- In which areas of nuclear science or industry are these specialists needed?
- How many nuclear specialists are needed and when are they needed?

- Which universities currently offer programmes with a nuclear content?
- For each university, what is the total number of students enrolled in nuclear related programmes? How many graduates at each level complete these programmes? Provide numbers for the last ten years if possible. Please include details on the gender balance if available.
- For each university, describe the level of teaching experience in nuclear related programmes. Is there any access to specialist teaching staff from elsewhere? How does that arrangement work?
- For each institution, describe the laboratory facilities available. Is there access to laboratory facilities elsewhere? If so, what are these facilities and where are they located?

- Do any of the universities collaborate in a formalized committee or network?

- Are there any international partnerships in the teaching or research of nuclear topics?

- How is funding obtained? Include details of the Government or State's contributions, industry contributions and student fees and the provision of bursaries.

Nuclear Indicators

National INEAS Nuclear Programmes Self-assessment		IAEA International Atomic Energy Agency *Atoms for Peace and Development*											
Name of country/university		Current Status				Score	Achievable Status				Score	Votes Cast Current	Votes Cast Achievab
Question		0	1	2	3		0	1	2	3			
N1	Development level of nuclear educational programmes to address the national priorities					#DIV/0!					#DIV/0!	0	0
N2	Students completion rate in nuclear related subjects					#DIV/0!					#DIV/0!	0	0
N3	Number of nuclear students graduating each year at bachelor's level					#DIV/0!					#DIV/0!	0	0
N4	Number of nuclear students graduating each year at master's level					#DIV/0!					#DIV/0!	0	0
N5	Number of students completing a nuclear PhD each year					#DIV/0!					#DIV/0!	0	0
N6	Number of nuclear research papers published each year					#DIV/0!					#DIV/0!	0	0
N7	Number of nuclear courses available by distance learning					#DIV/0!					#DIV/0!	0	0
N8	Number of nuclear experienced university lecturers					#DIV/0!					#DIV/0!	0	0
N9	Status of universities and other educational organizations nuclear outreach programmes to potential students and the general public					#DIV/0!					#DIV/0!	0	0
N10	Number of entry level nuclear related vacancies and internships in industry, including in academia					#DIV/0!					#DIV/0!	0	0
N11	Number of professional level nuclear related vacancies in industry, including academia					#DIV/0!					#DIV/0!	0	0
N12	Level of support for nuclear education programmes (funding, internships, etc.) from industry					#DIV/0!					#DIV/0!	0	0
N13	Status of employer development or support of outreach programmes to potential students, employees and the general public					#DIV/0!					#DIV/0!	0	0
N14	Society's awareness of the benefits of nuclear science and technology					#DIV/0!					#DIV/0!	0	0
N15	Support for nuclear technologies from the general public					#DIV/0!					#DIV/0!	0	0
N16	Status of government support for nuclear outreach programmes to potential students and the general public					#DIV/0!					#DIV/0!	0	0
N17	Level of government funding for nuclear education and training programmes					#DIV/0!					#DIV/0!	0	0
N18	Level of government funding for nuclear industrial projects					#DIV/0!					#DIV/0!	0	0

Radiological Indicators

National INEAS Radiological Programmes Self-assessment													
Name of country/organisation		IAEA International Atomic Energy Agency *Atoms for Peace and Development*											
		Current Status				Score	Achievable Status				Score	Votes Cast Current	Votes Cast Achievable
Question		0	1	2	3		0	1	2	3			
R1	Development level of radiological educational programmes to address national priorities	1	1	2	4	2.125	0	0	4	4	2.5	8	8
R2	Students completion rate in radiological related subjects					#DIV/0!					#DIV/0!	0	0
R3	Number of radiological students graduating each year at bachelor's level					#DIV/0!					#DIV/0!	0	0
R4	Number of radiological students graduating each year at master's level					#DIV/0!					#DIV/0!	0	0
R5	Number of students completing a radiological PhD each year					#DIV/0!					#DIV/0!	0	0
R6	Number of radiological research papers published each year					#DIV/0!					#DIV/0!	0	0
R7	Number of radiological courses available by distance learning					#DIV/0!					#DIV/0!	0	0
R8	Number of radiological experienced university lecturers					#DIV/0!					#DIV/0!	0	0
R9	Status of universities and other educational organizations radiological outreach programmes to potential students and the general public					#DIV/0!					#DIV/0!	0	0
R10	Number of entry level radiological related vacancies and internships in industry, including in academia					#DIV/0!					#DIV/0!	0	0
R11	Number of professional level radiological related vacancies in industry, including academia					#DIV/0!					#DIV/0!	0	0
R12	Level of support for radiological education programmes (funding, internships, etc.) from employers					#DIV/0!					#DIV/0!	0	0
R13	Status of employer development or support of outreach programmes to potential students, employees and the general public					#DIV/0!					#DIV/0!	0	0
R14	Society's awareness of the benefits of radiological science and technology					#DIV/0!					#DIV/0!	0	0
R15	Support for radiological technologies from the general public					#DIV/0!					#DIV/0!	0	0
R16	Status of government support for radiological outreach programmes to potential students and the general public					#DIV/0!					#DIV/0!	0	0
R17	Level of government funding for radiological education and training programmes					#DIV/0!					#DIV/0!	0	0
R18	Level of government funding for radiological industrial projects					#DIV/0!					#DIV/0!	0	0
R19	Level of government funding for radiological medical projects					#DIV/0!					#DIV/0!	0	0
R20	Level of government funding for radiological agricultural projects					#DIV/0!					#DIV/0!	0	0

Needs and Offers Workshop

What do you need?

- Students
- Staff
- Facilities
  - Laboratories
  - Licensed Facilities
  - Distance Learning
- Equipment
  - Books
  - Laboratory Equipment
  - Consumables
- Expertise

What can you offer?

- Students
- Staff
- Facilities
- Laboratories
- Licensed Facilities
- Distance Learning
- Equipment
- Books
- Laboratory Equipment
- Consumables
- Expertise

Phase II - Development

- Assess the status of Phase I activities and review the action plan
- Establish a national steering committee and if appropriate a national network on nuclear education
- Establish an educational programme to meet the national requirements
- Present an overview of current IAEA educational services that can support the education programme
- Establish an employer external advisory board for the educational programmes
- Develop a workplan and allocate actions with timeframes

Action Plan

Action	Owner	Start Date	Delivery Date

This needs to be detailed, too much is better then too little, break the Actions down if required

Ensure the Project Manager has full contact details before the Mission finishes

Some Start Dates may depend on the completion of other Actions or the availability of the Owner

Be realistic, some slippage may be unavoidable but make the dates achievable

Phase III - Evaluation

- Assess the status of Phase II activities
- Develop indicators based on the initial self-assessment carried out in Phase I for sustainable nuclear education
- Establish a process for the reporting and analysis of the indicators
- Identify where strengthening of the capability is required
- Development of a strategy to optimize the capability
- Update the workplan and allocate actions with timeframes

Agenda

TIME	ACTIVITY	LEAD
DAY 1: Tuesday, 18th of November, 2025		**Dumitru Chirlesan, ANUEN**
10.00 – 11.30	**Opening session**	
	Opening Remarks	1. Helena Zhivitskaya, IAEA 2. Mihnea COSTOIU, UNSTPB, RECTOR
	Introduction	All participants
	Introductory remarks and overview of National Nuclear Programme (highlighting strategy and action plan)	1. Cristian BUȘOI - SS 2. Sorin ELISEI - DG
11.30 – 12.00	**Coffee Break + Group photo**	
12.00 – 13.30	**Introductory Session**	
	Introducing the objectives of the mission and the processes to be used during the week and expected outputs	Helena Zhivitskaya, IAEA
	IAEA presentations on NKM Section activities and support for establishing nuclear educational and training programmes	Helena Zhivitskaya, IAEA
13.30 – 15.00	**Lunch Break**	
15.00 – 16.30	**Working Session #1**	
	Nuclear science and technology education programme in Romania	Dumitru Chirlesan, ANUEN
	Radiological and medical sciences education programmes in Romania	"Carol Davila" University of Medicine and Pharmacy, Bucharest 1. Corina-Silvia POP 2. Cosmin DUGAN
	Regulatory body (how they work with safety, do they have a legal document in place, a strategy)	CNCAN (to be decided...)
16.30 – 17.00	**Summary of the Day 1**	

Agenda

TIME	ACTIVITY	LEAD
DAY 2: Wednesday, 19th of November, 2025		**Helena Zhivitskaya, IAEA**
10.00 – 11.00	**Opening session**	
	Results and discussion on the national preliminary survey that was conducted prior to the mission (ANUENs' review)	Dumitru Chirlesan, ANUEN
11.00 – 11.30	**Coffee Break**	
11.30 – 13.30	**Working Session #2**	
	Experts' introductory presentations: Experts will share the experience of establishing nuclear educational and training programmes.	Joerg Starflinger, Stuttgart University
		Gabriel-Lazaro PAVEL, ENEN
	Results and discussion on the national preliminary survey that was conducted prior to the mission (experts' review)	
13.30 – 14.30	**Lunch Break**	
14.30 – 16.30	**Self-assessment workshop**	
	Self-assessment workshop on the analysis of the current and achievable state of the nuclear and radiological education and training programmes using the self-assessment tool.	All
16.30 – 17.00	**Summary of the Day 2**	

Agenda

TIME	ACTIVITY	LEAD
DAY 3: Thursday, 20th of November, 2025		**Joerg Starflinger, Stuttgart University**
10.00 – 11.00	**Analysis of needs and developing action plan #1**	
	Identification of institutional knowledge needs and offers	All
11.00 – 11.30	**Coffee Break**	
11.30 – 13.30	**Analysis of needs and developing action plan #2**	
	Cluster analysis	All
13.30 – 14.30	**Lunch Break**	
14.30 – 16.30	**Analysis of needs and developing action plan #3**	
	Development of action plans, nomination of project managers and establishment of working groups	All
16.30 – 17.00	**Summary of the Day 3**	

Agenda

TIME	ACTIVITY	LEAD
DAY 4: Friday, 21st of November, 2025		**Gabriel-Lazaro PAVEL, ENEN**
10.00 – 11.00	**Finalizing the action plan #1**	
	Development of action plans, nomination of project managers and establishment of working groups	All
11.00 – 11.30	**Coffee Break**	
11.30 – 13.30	**Finalizing the action plan #2**	
	Draft Recommendations	All
13.30 – 14.30	**Lunch Break**	
14.30 – 16.30	**Analysis of needs and developing action plan #3**	
	Meeting summary: 1. Conclusions and Recommendation 2. Closing remarks	Helena Zhivitskaya, IAEA Dumitru Chirlesan, ANUEN
16.30 – 17.00	**Summary of the Day 4. End of mission**	

NKM Section activities and support for establishing nuclear educational and training programmes

IAEA INEAS MISSION IN ROMANIA

18-21 November 2025

Dr., MBA, Eng., Helena Zhivitskaya, NKMS, IAEA

h.zhivitskaya@iaea.org

The International Atomic Energy Agency - IAEA

- **Established in 1957**
- **178 Member States**
- **~ 2,500 multidisciplinary staff from more than 100 countries**

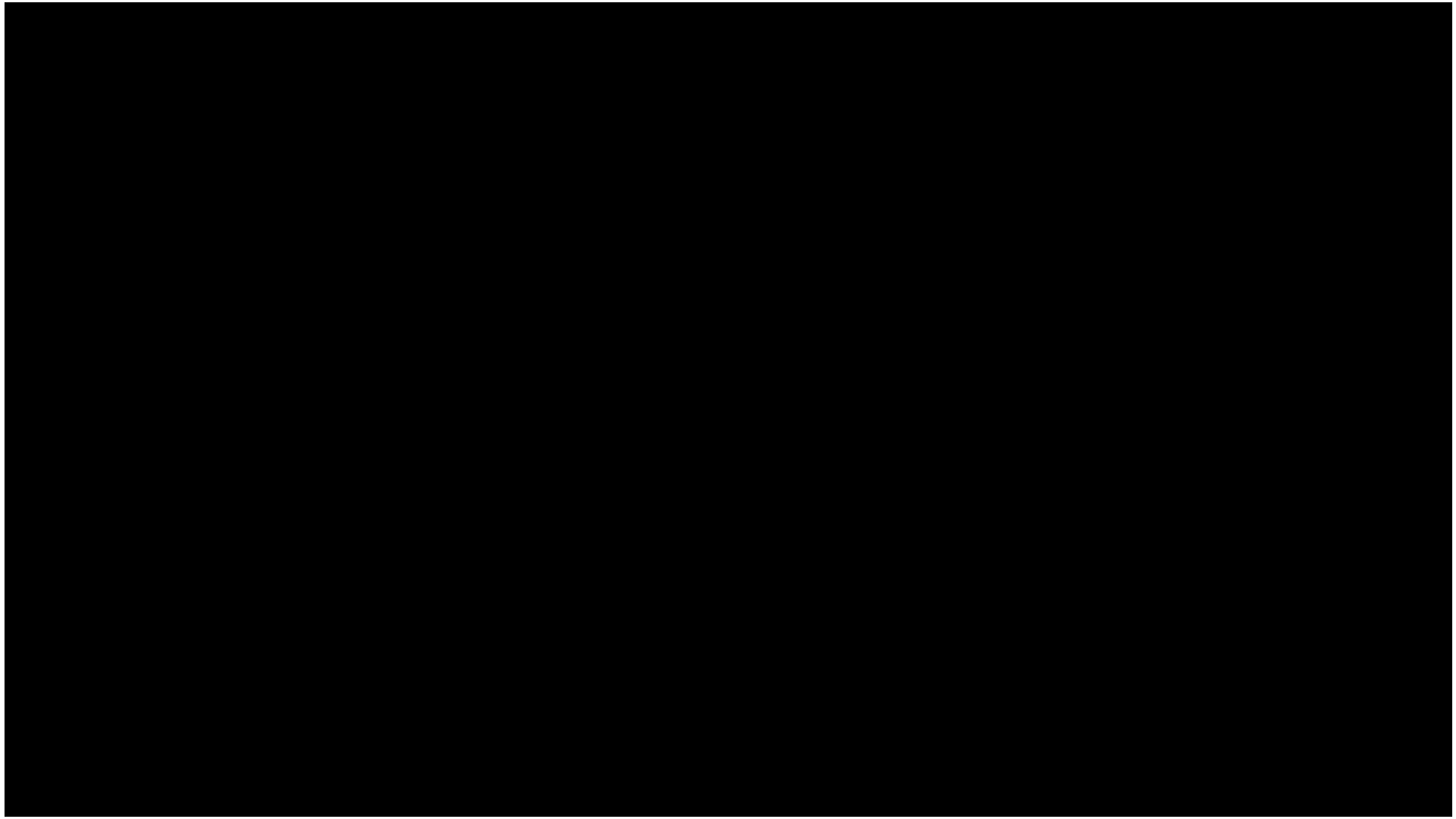
ATOMS FOR PEACE AND DEVELOPMENT

Safeguards and Verification

Safety, Security

Science and Technology

This is the IAEA



Based on the IAEA Capacity Building concept

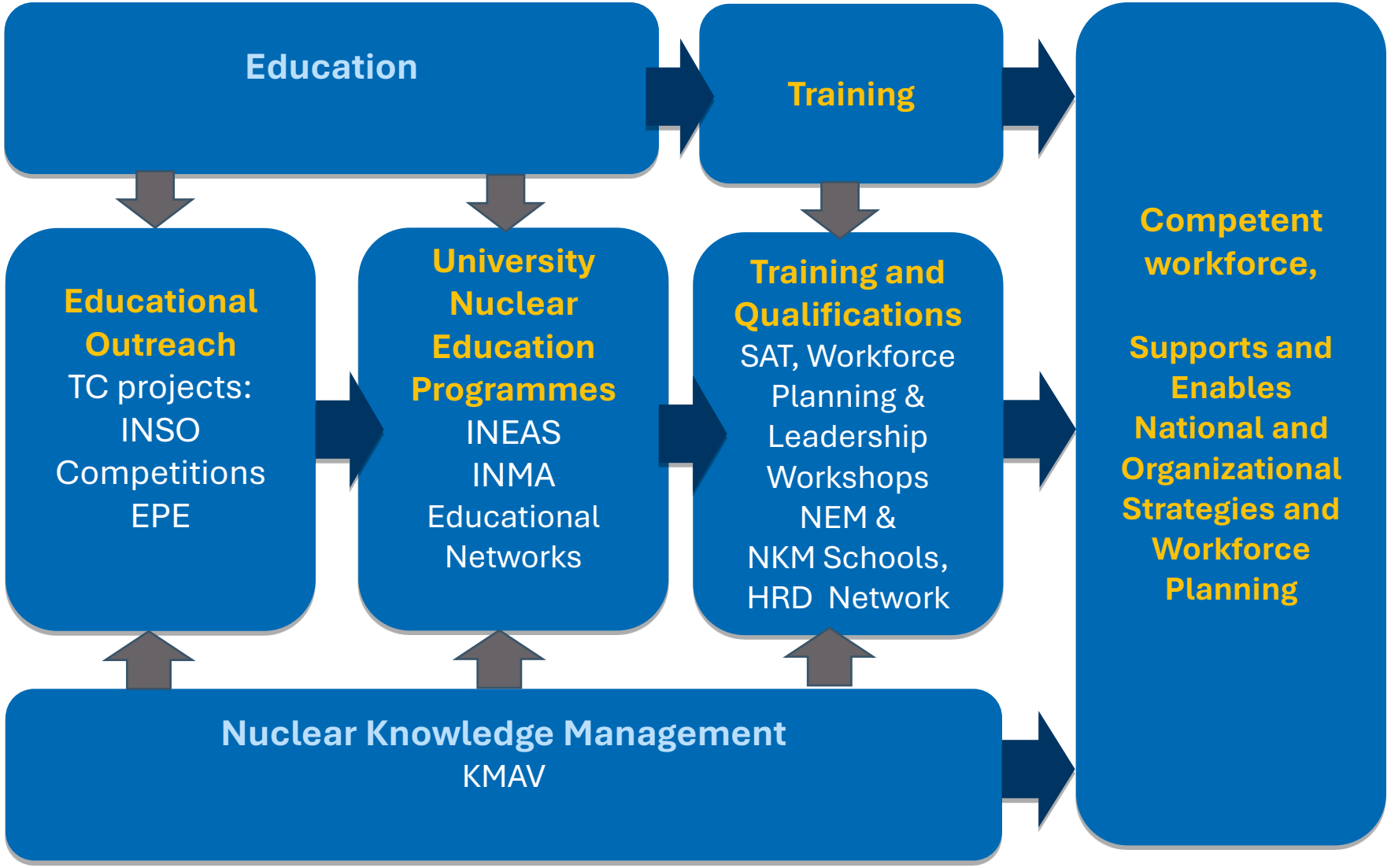
"Capacity building has been defined as a systematic and integrated approach to develop and continuously ***improve the governmental, organizational and individual competencies and capabilities*** *necessary for achieving a safe, secure and sustainable nuclear power programme."*

Five essential elements of the umbrella approach for capacity building and extending resilient capacity:

- Education and Training;
- Leadership & Resilience Professional Development;
- Human Resource Development;
- Knowledge Management;
- Knowledge Networks.

IAEA, 2015. Report on Capacity Building for Nuclear Safety. Vienna, International Atomic Energy Agency.

Integrated Nuclear Knowledge Management and Human Resource Development



Educational Outreach

Educational Networks

2022 INSTA

2021 Renewed Collaboration Agreement

2017 Renewed Collaboration Agreement

2015 STARNET

2013 First Collaboration Agreement

2013 AFRA-NEST

2010 LANENT

2004 ANENT

Partners
ENEN,NTEC, UNENE, BNEN

- Promote regional cooperation
- Share educational experience and resources
- Forum for discussion of policies and strategies
- Share best practices and lessons learned
- Share e-courses and training materials
- Outreach programmes

IAEA

TM on Educational Networks 2025

8-12 December 2025

https://t.me/nucednets

Networks activities

t.me/nucednets

t.me/nucednets

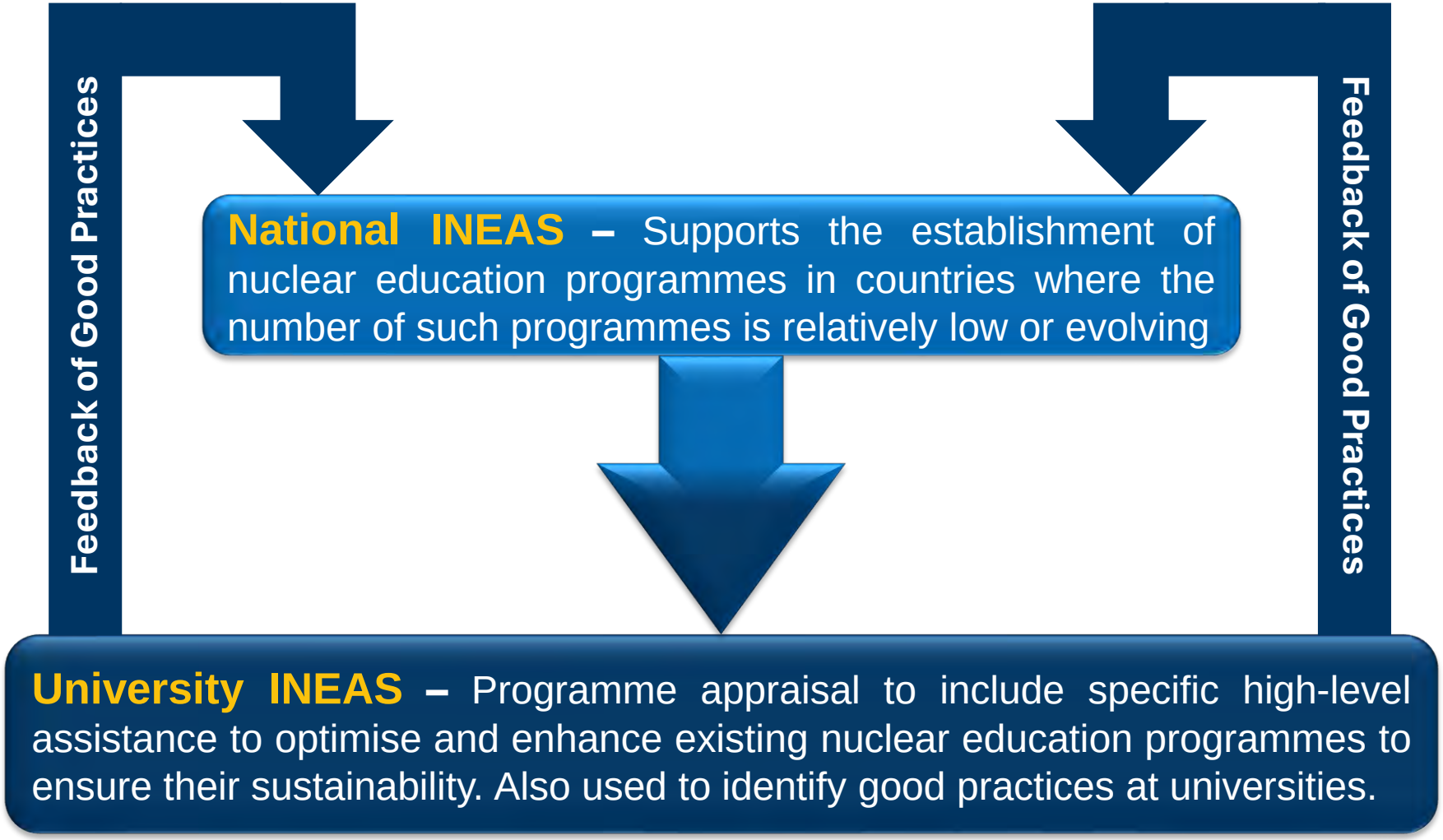
✓ Distance / online learning using LMS and network web-portals

- delivery of LMS-based training,
- virtual experiments
- Sharing and exchange of training materials
- online repositories and libraries
- webinars

✓ NKM awareness-raising and organic capacity building

- NKM-related Conferences
- NKM and NEM Schools
- INEAS
- INMA
- KM Assist Visits

Integrated Nuclear Education Advisory Services



International Nuclear Management Academy

A collaboration between the IAEA and leading universities to develop and deliver
Master's programmes in Nuclear Technology Management

INMA Curriculum

1. External Environment

Political, legal, regulatory and societal aspects in which nuclear managers operate

2. Nuclear Technology

Basics of nuclear technology and its application that are involved directly or indirectly in the management of nuclear facilities for power and non-power applications

3. Management

Challenges and practices of management in the nuclear sector with due consideration of safety, security and economics

4. Leadership

Strong ethical behaviour, clear vision and goal setting, commitment to safety and security, good communication skills with all stakeholders and a professional attitude

INMA Universities

Members

National Research Nuclear University MEPhI, Russia

The University of Tokyo, Japan

Texas A&M University, United States of America

North-West University, South Africa

University of the Witwatersrand, South Africa

Budapest University of Technology and Economics, Hungary

National Polytechnic University, Armenia

University of West Bohemia, Czech Republic

KEPCO International Nuclear Graduate School, Korea

University of Idaho, United States of America

Candidates

Sofia University St. Kliment Ohridski, Bulgaria

Harbin Engineering University, China

Ontario Tech University, Canada

Yerevan State University, Armenia

Tsinghua University, China

Xi'an Jiaotong University, China

University of Ghana, Ghana

NEM and NKM Schools

Nuclear Energy Management School

Target Audience
Future Leaders and Managers in Nuclear Energy Sector

- IAEA-wide contributions from 13 sections/offices, plus external experts
- Curriculum based on 4 main topics
- 2-week residential course
- Schools include lectures, panel discussions, group projects, case studies, tests and technical visits
- 60+ NEM schools since 2010
- 2,100+ participants from 104 countries

Nuclear Knowledge Management School

Target Audience
Managers and NKM/HRD/T&Q experts involved in implementing NKM activities

- Teaching staff drawn from specialists in the field
- Principal topics on human resources development, competence and knowledge management
- Well defined curriculum to provide an understanding of approaches, tools and mechanisms
- 1-week residential course
- 30+ schools since 2004
- 1,200+ participants from 82 Countries

NEM School Curriculum

1	**IAEA and Nuclear Technology**	1.1 IAEA and its Services 1.2 Overview of Nuclear Applications 1.3 Introduction to Nuclear Power 1.4 The Concept of Risk
2	**Key Issues and Challenges**	2.1 Climate Change and Nuclear Energy 2.2 An Integrated Approach to HRD and NKM 2.3 Management and Leadership in a Nuclear Organisation 2.4 Stakeholder Involvement and Public Communication
3	**IAEA 3S Requirements**	3.1 Nuclear Law 3.2 Nuclear Safety 3.3 Nuclear Security 3.4 Nuclear Safeguards 3.5 National Nuclear Legislation
4	**Nuclear Technology Lifecycles**	4.1 Advanced Nuclear Power Technologies 4.2 New Nuclear Builds 4.3 Basic Principle of Nuclear Power Plant Operation 4.4 Radioactive Waste Management 4.5 Nuclear Fuel Cycle

Core Topics Elective Topics

NKM School Curriculum

1	**Orientation and Awareness**	1.1 NKM as a Business Management Tool 1.2 Introduction of the Main Steps of NKM Implementation 1.3 National and Organizational Workforce Planning 1.4 Definitions and Main Principles of Knowledge Sharing Culture
2	**Analysis of Safety Requirements and Business Needs**	2.1 Critical Knowledge 2.2 NKM Risk Assessment
3	**Policy and Strategy**	3.1 Implementation and the Assignment and Description of NKM Roles and Responsibilities 3.2 Importance of Motivation and Communication in NKM
4	**Design and Launch**	4.1 Knowledge Capture Methods 4.2 Competency Mapping
5	**Expand and Support**	5.1 Succession Management 5.2 Coaching and Mentoring for NKM
6	**Institutionalization**	6.1 Introduction to Information Management 6.2 Indicators for a Comprehensive NKM System
7	**Evaluation and Continuous Improvement**	7.1 Use and Importance of Lessons Learned and Corrective Action Programmes 7.2 NKM Self-Assessment


中国—国际原子能机构核能管理学校2023年核能管理短训班开班式
Opening Ceremony of the China-IAEA Nuclear Energy Management School 2023
中国·北京 Beijing, China, 23 Oct. 2023


Certificate Distribution

Human Resource Development (HRD)

Focus: Acquiring, maintaining, and developing competent personnel

- HRD is critical for ensuring that the nuclear workforce has the necessary skills and competencies to perform their roles effectively.

Support: Guidance documents, workshops, review services, workforce planning tools

- Provide a range of support services to help Member States develop their human resources, including guidance documents, workshops, and tools for workforce planning.

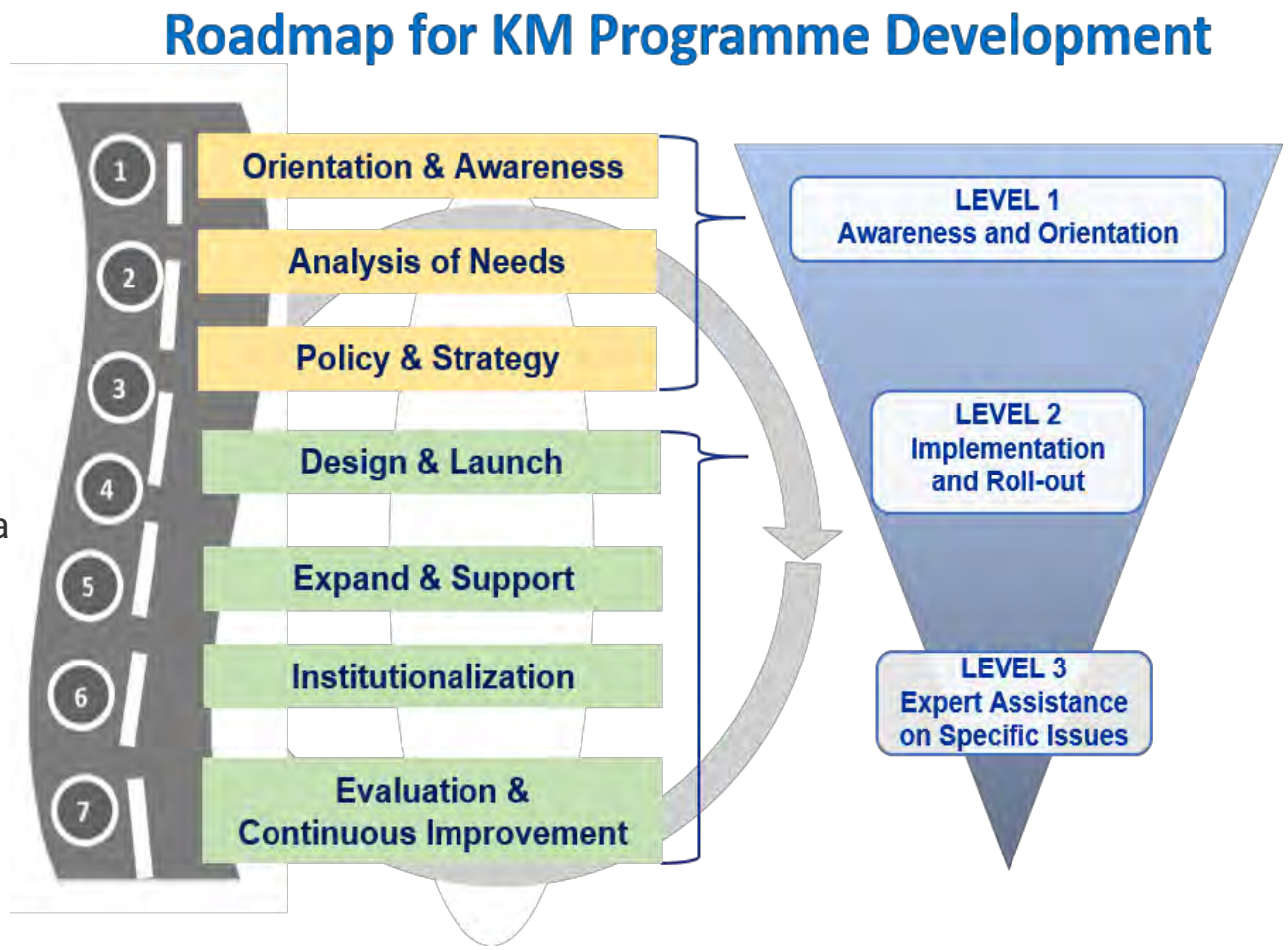
Knowledge Management Assist Visit (KMAV)

Purpose:

- **Comprehensive Peer Review**: Provide expert advice to improve nuclear knowledge management programme and practices.
- **Tailored Support**: Offer three levels of support to meet organizational needs.

Format:

- **Level 1**: Rises awareness about NKM benefits and risks associated with the loss of critical knowledge, enables a nuclear organization to initiate a strategic knowledge management programme.
- **Level 2**: Assesses an existing knowledge management programme in a nuclear organization and supports its further development and improvement
- **Level 3**: Provides focused expert assistance on specific technical or implementation issues, addressing the challenges faced by the nuclear organization.

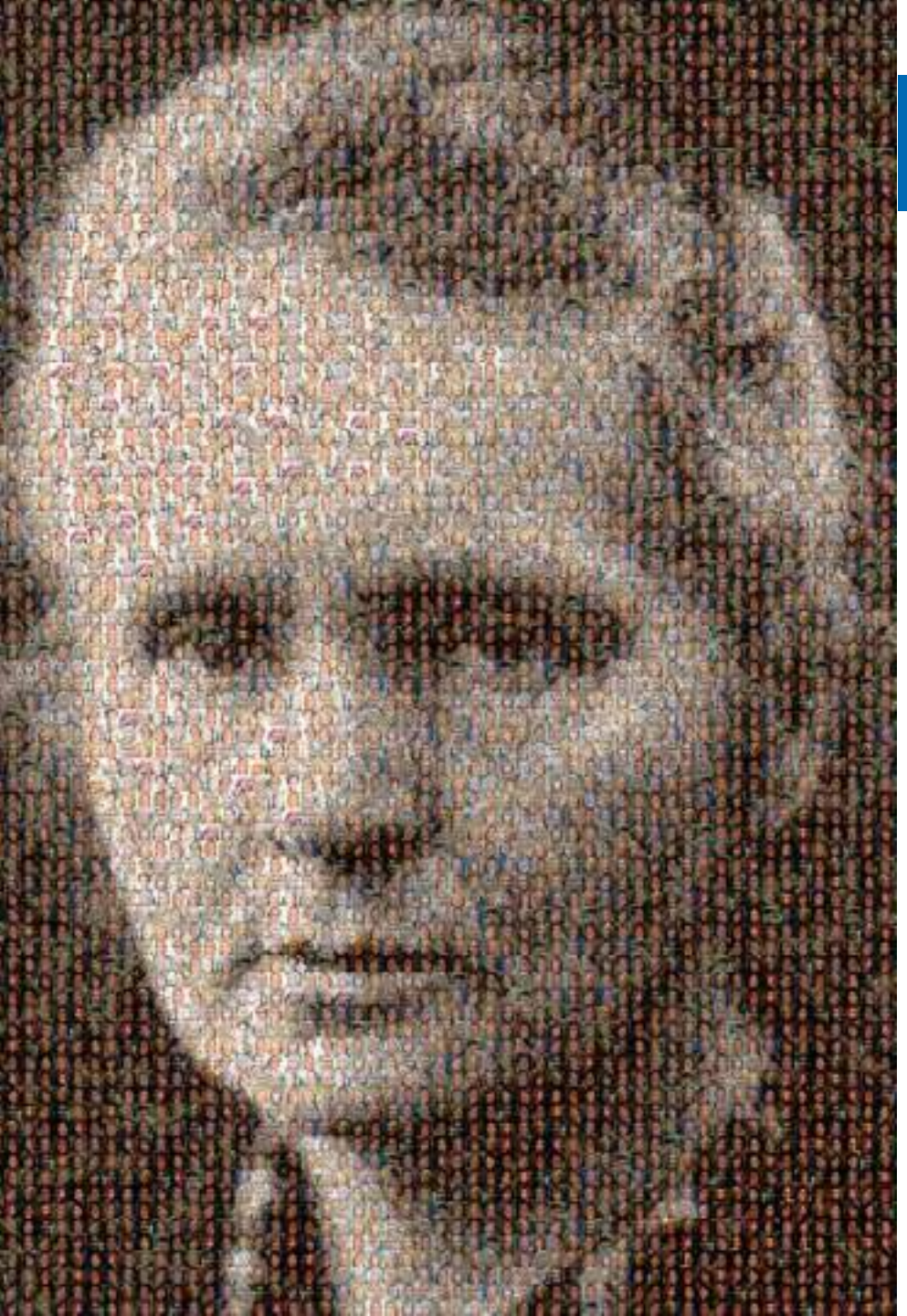


Publication

TECDOC-2078 Lessons Learned Programmes for Effective Knowledge Management in Nuclear Organizations

TECDOC - 2080 Key Performance Indicators to Support NKM Programmes

TECDOC – 2082 Use of a Graded Approach in the Application of SAT for Facilities and Activities



IAEA Marie Sklodowska-Curie Fellowship Programme

- Encourage women to pursue a nuclear career in and help build a future diverse workforce
- Provide students with scholarships for nuclear master’s programmes and internships facilitated by the IAEA
- Annually increasing the number of students receiving support

Strengthening education pipeline and increasing workforce diversity

IAEA Lise Meitner Programme

- Launched by the IAEA Director General, Mr. Grossi, on March 8, 2023

Aim

- To support career development and retention of women in the nuclear sector. Provides women professionals with opportunity to advance technical and soft skills in the nuclear field

Thank you!

Helena Zhivitskaya, NKMS, IAEA

h.zhivitskaya@iaea.org