ESTABLISHING SUSTAINABLE INFRASTRUCTURES FOR EDUCATION AND TRAINING IN RADIATION, TRANSPORT AND WASTE SAFETY: IAEA'S APPROACH TO SUPPORT MEMBER STATES

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Outline

IAEA's mission and safety functions

- *Role of Education and Training (E&T)*

IAEA Strategic Approach to E&T in rad., transp. and waste safety

- *Principles of IAEA's support to Member States in the field of E&T*

National Strategy for E&T in rad., transp. and waste safety

- *The guidance on a methodology to establish the national strategy*

IAEA support to build education and training infrastructures

- *Cooperation projects to promote the establishment of the national strategy*

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IAEA Safety functions

IAEA Functions in Radiation & Waste Safety (Article III.A.6)

To establish standards of safety

To provide for the application of standards

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IAEA Safety functions

To provide for the application of standards

INTERNATIONAL MECHANISMS FOR APPLYING STANDARDS

- **Rendering RADIATION SAFETY SERVICES**
- **Providing TECHNICAL COOPERATION**
- **Fostering INFORMATION EXCHANGE**
- **Knowledge Management & Networking**
- **Promoting EDUCATION & TRAINING**

Education and Training

is one of the mechanisms and primary strategies for assisting Member States in the application of the standards

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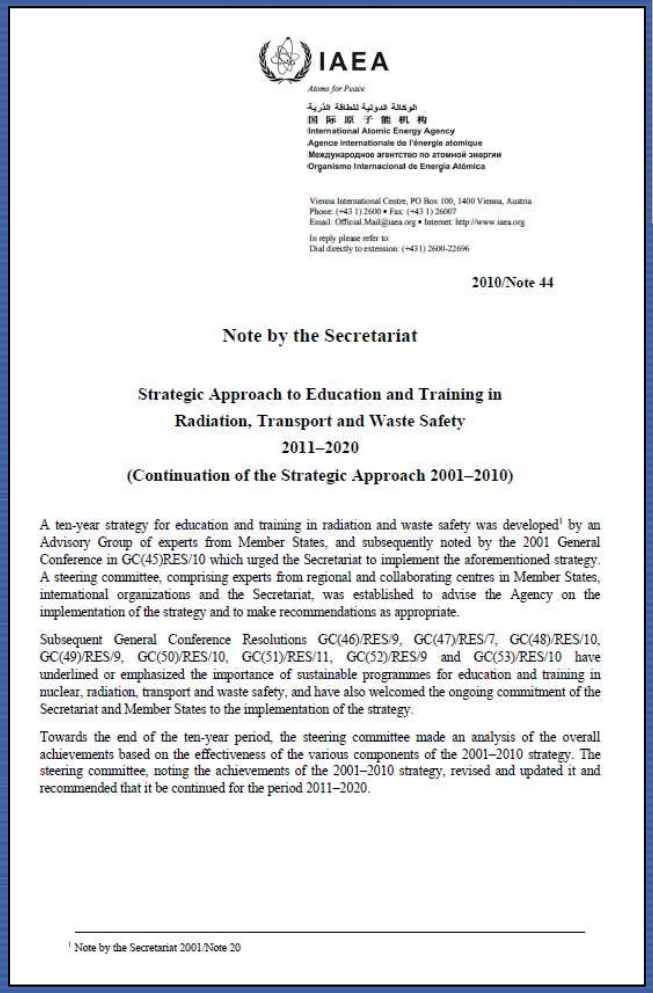
IAEA STRATEGIC APPROACH 2011- 2020

"IAEA Strategic Approach to Education and Training in Radiation, Transport and Waste Safety 2011–2020"

Submitted to the IAEA Policy Making Organs in 2010, where it was endorsed by the General Conference

Steering Committee



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2010/Note 44

Note by the Secretariat

Strategic Approach to Education and Training in Radiation, Transport and Waste Safety 2011–2020 (Continuation of the Strategic Approach 2001–2010)

A ten-year strategy for education and training in radiation and waste safety was developed[1] by an Advisory Group of experts from Member States, and subsequently noted by the 2001 General Conference in GC(45)RES/10 which urged the Secretariat to implement the aforementioned strategy. A steering committee, comprising experts from regional and collaborating centres in Member States, international organizations and the Secretariat, was established to advise the Agency on the implementation of the strategy and to make recommendations as appropriate.

Subsequent General Conference Resolutions GC(46)/RES/9, GC(47)/RES/7, GC(48)/RES/10, GC(49)/RES/9, GC(50)/RES/10, GC(51)/RES/11, GC(52)/RES/9 and GC(53)/RES/10 have underlined or emphasized the importance of sustainable programmes for education and training in nuclear, radiation, transport and waste safety, and have also welcomed the ongoing commitment of the Secretariat and Member States to the implementation of the strategy.

Towards the end of the ten-year period, the steering committee made an analysis of the overall achievements based on the effectiveness of the various components of the 2001–2010 strategy. The steering committee, noting the achievements of the 2001–2010 strategy, revised and updated it and recommended that it be continued for the period 2011–2020.

[1] Note by the Secretariat 2001/Note 20

MAIN ELEMENTS OF THE IAEA STRATEGY

- **Vision**

Education and Training infrastructures

for building and maintaining national competence in radiation, transport and waste safety,

are in place in Member States,

consistent with IAEA safety standards

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MAIN ELEMENTS OF THE IAEA STRATEGY

- **Objectives**

  - To *strengthen* radiation, transport and waste safety infrastructures through building competence in MSs

  - To *ensure* that E&T programmes in MSs address the requirements of the IAEA safety standards

  - To *facilitate* the establishment of a national strategy for E&T in rad., transp. and waste safety in MSs

Output

Guidance on the establishment and implementation of a national strategy for E&T

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IMPLEMENTATION OF THE IAEA STRATEGY

- **Key players**
  - IAEA
  - Member States
  - Regional Training Centres (RTCs)

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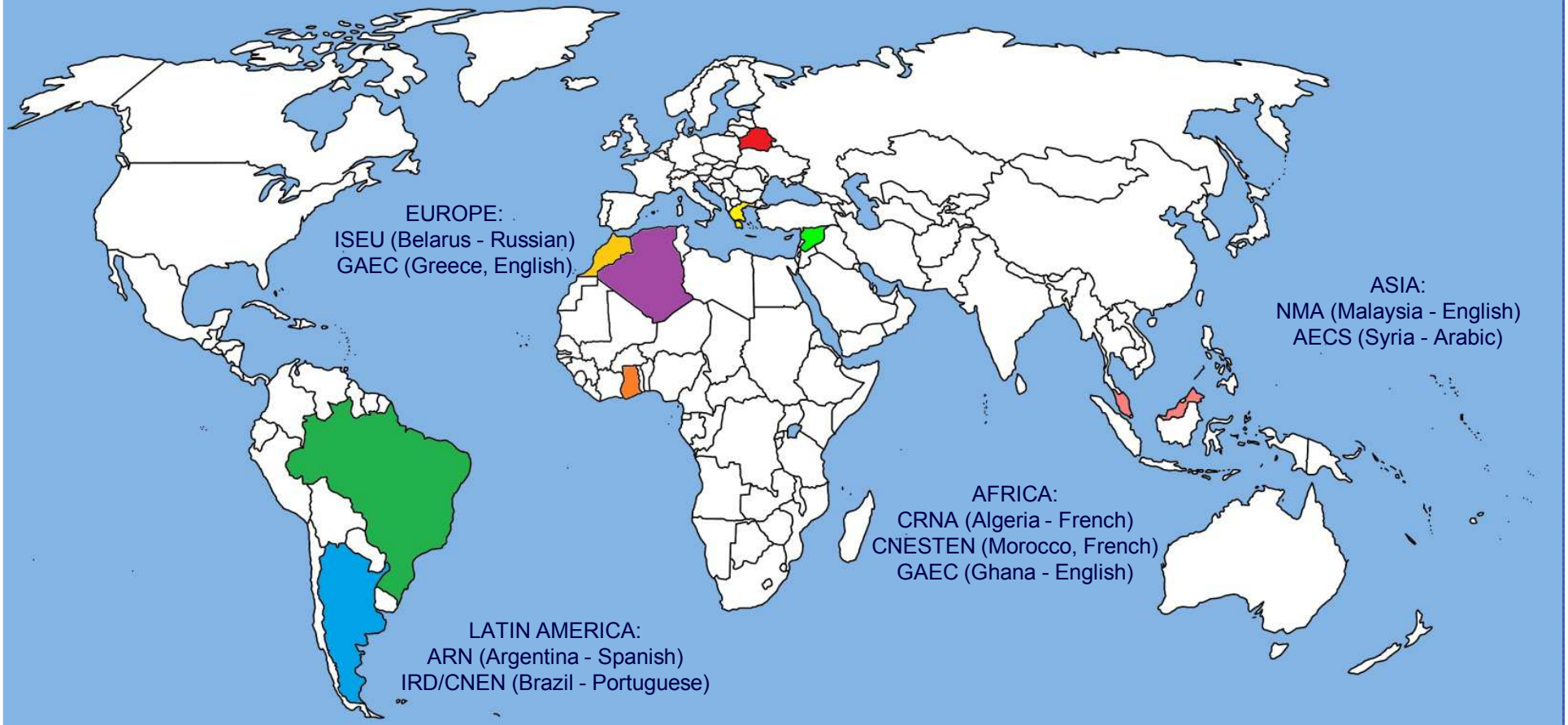
IMPLEMENTATION OF THE IAEA STRATEGY

Regional Training Centres



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IMPLEMENTATION OF THE IAEA STRATEGY

Regional Training Centres

IMPLEMENTATION OF THE IAEA STRATEGY

	Stage I: Preparation	Stage II: Promotion	Stage III: Implementation
Activities	Preparation of the competence building tools and guidance to establish a national strategy for education and training	Dissemination and promotion of tools and guidance at regional level among the Member States	Development and implementation of national strategies in Member States
Key-players	IAEA	RTCs	Member States

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GENERAL FRAMEWORK ON NAT. STRAT. FOR E&T

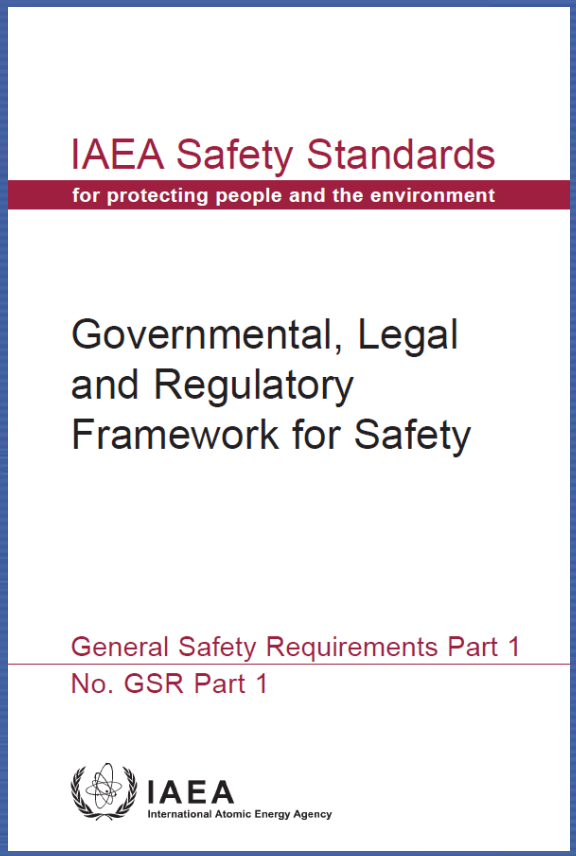
- Requirement 1

  National policy and strategy for safety

  - The government shall establish a national policy and strategy for safety..
  - In the national policy and strategy, account shall be taken of the following:

    …. The need and provision for human resources
  - The governmental, legal and regulatory framework for safety includes:

    …. Provision for acquiring and maintaining the necessary competence nationally for ensuring safety



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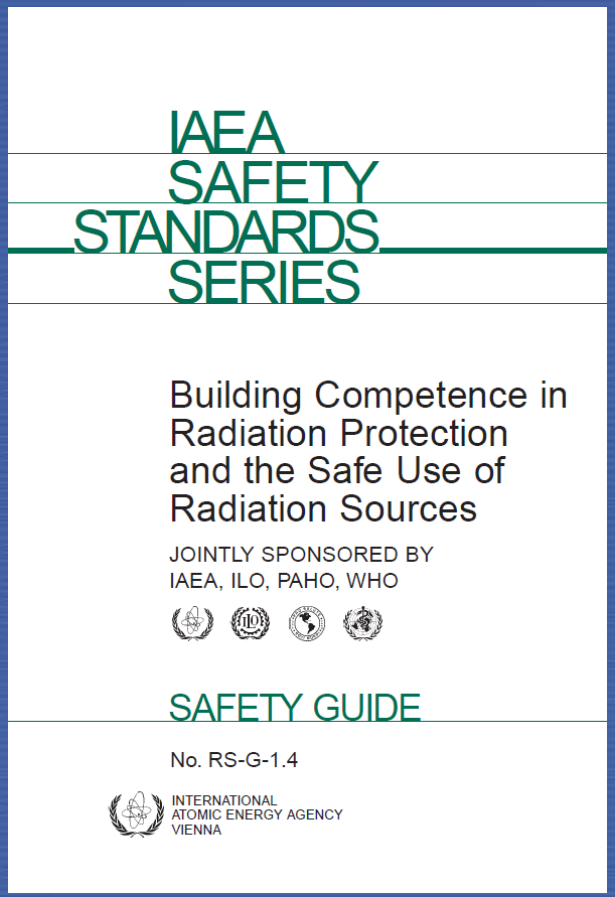
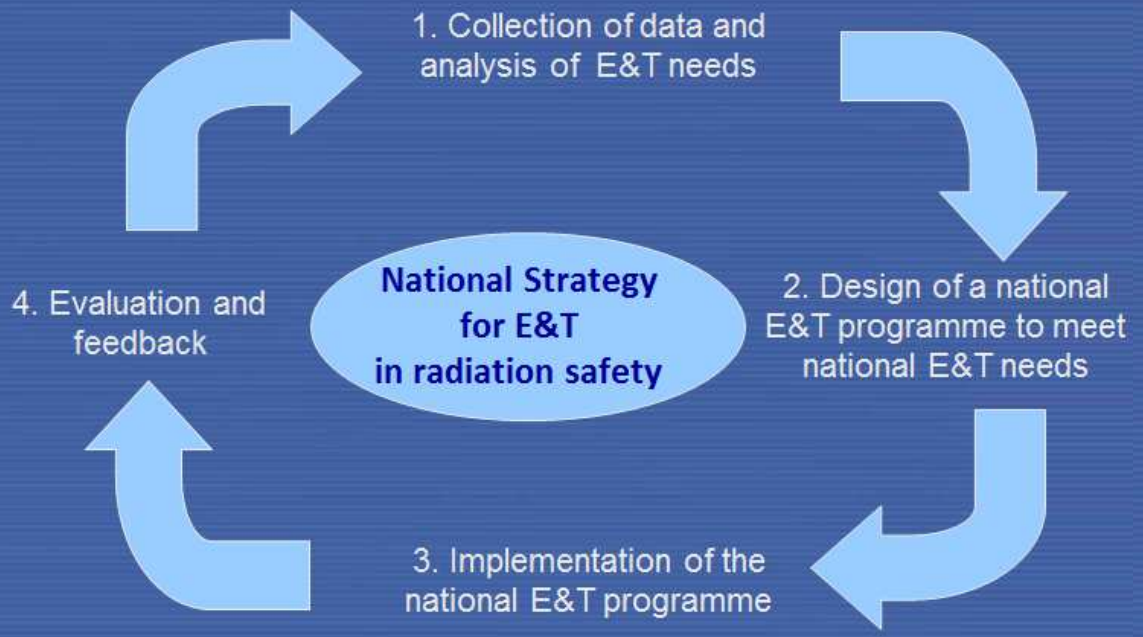
GENERAL FRAMEWORK ON NAT. STRAT. FOR E&T





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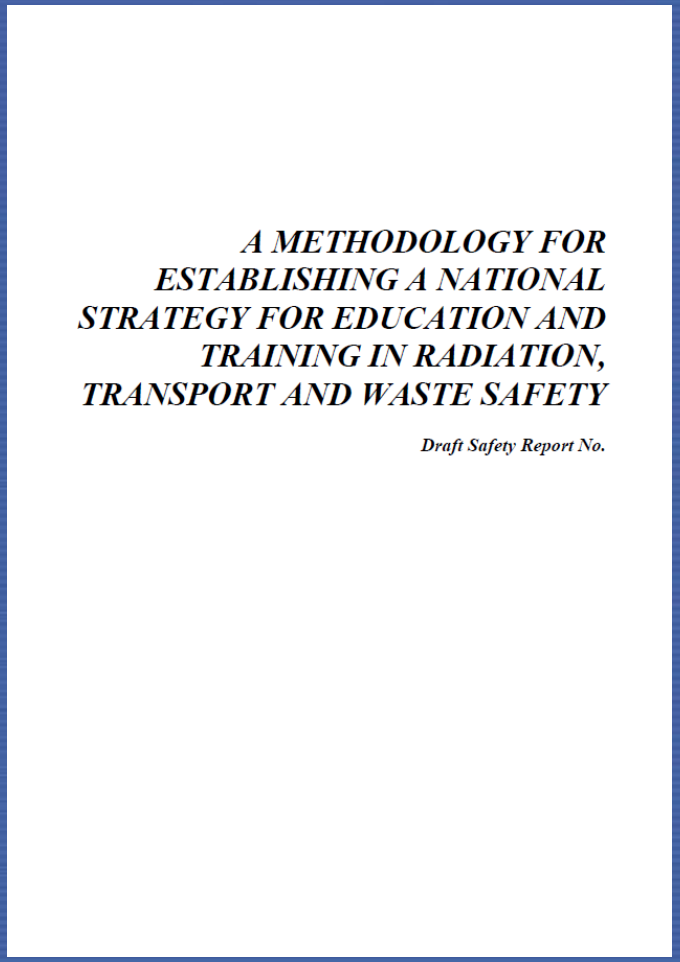
GUIDANCE NAT. STRAT. ON E&T

- A practical tool for assisting Member States to establish a national strategy for education and training in radiation, transport and waste safety



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GUIDANCE NAT. STRAT. ON E&T

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Annex I:

- illustrates the practical application of the guidance for a hypothetical country
- helps to visualize the implementation of the various steps of the process in a practical way.

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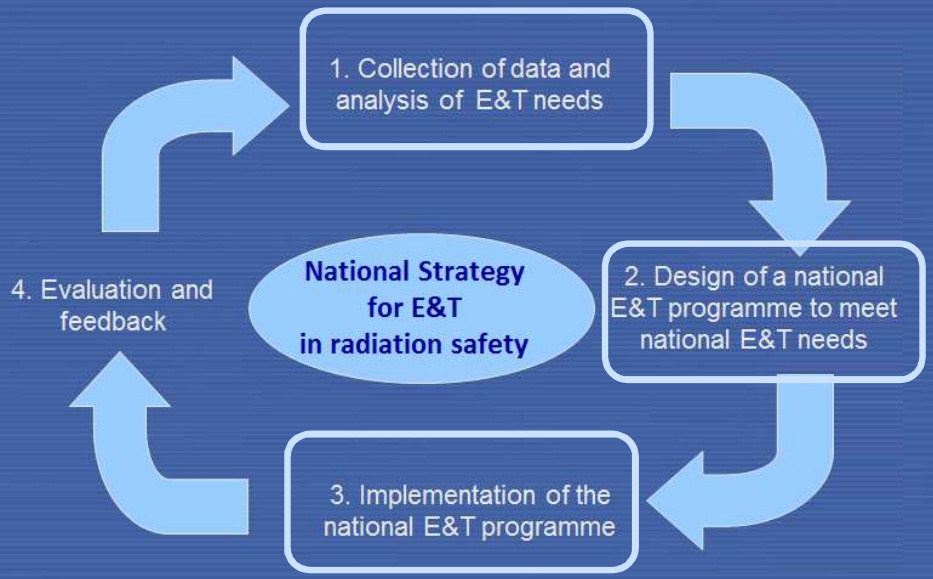
GUIDANCE - ANNEX I



1. Analysis of training needs

2. Design of the National E&T Programme

3. Development and Implementation of the National E&T Programme

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GUIDANCE - ANNEX I

1. Analysis of training needs

Practices using radiation sources	Number of facilities			Qualified Expert (QE)			Radiation Protection Officer (RPO)			Operator			Health Professionals (HP) (****)		
	Existing	Foreseen (< 5 yrs)	Total	Existing	Estimated QEs required	QEs to be trained	Existing	Estimated RPOs required	RPOs to be trained*	Existing	Estimated Operators required	Operators to be trained	Existing	Estimated HPs required	HPs to be trained
INDUSTRIAL and RESEARCH															
Industrial radiography	11	2	13				3	13	10	88	104	16			
Industrial irradiator facilities (industrial and research)	2		2				2	2	0	3	4	1			
Industrial gauges and well logging	38	7	45				38	45	7	152	180	28			
Research activities: use of sealed and unsealed sources	12	3	15	0	7**	7	12	15	3	75	90	15			
Research accelerators or reactors	2		2	0	2	2	2	2	0	10	13	3			
Mineral extraction and processing companies (NORM)	10	2	12	0	6**	6	10	12	2	250	300	50			
MEDICAL															
Dental radiology (alone)	500	200	700***	0	0	0	0	0	0	300	400	100	700	900	200
Diagnostic and interventional radiology	620	120	740***	0	37**	37	225	270	45	400	740	340	800	1100	300
Radiotherapy and brachytherapy	3	1	4	1	4	3	3	4	1	20	28	8	10	14	4
Nuclear medicine	13	3	16	0	16	16	13	16	3	60	70	10	26	32	6
OTHER PRACTICES															

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GUIDANCE - ANNEX I

2. Design of the National E&T Programme

Practices	Category of personnel	Training provider	Training course	Total number to be trained	Remarks
Dental radiology	Operators	Professional Association	Radiation protection in the use of x-ray generators in dental radiology	100	Nil
Diagnostic and interventional radiology	QE	NTC with School of Medicine / National University	Advanced course in radiation protection in diagnostic and interventional radiology	37	Nil
	RPO	NTC	Training course in radiation protection in diagnostic and interventional radiology	45	Nil
	Operators	NTC	Radiation protection in the use of ionizing radiations in diagnostic and interventional radiology	140	Nil
Radiotherapy and brachytherapy	QE	RTC	Postgraduate Educational Course in Radiation Protection and the Safety of Radiation Sources [a)] + Specialized training course in radiation protection in radiotherapy [b)]	3	- The number of personnel to be trained does not justify the development of a national course yet - RB endorses the course [a)] provided at the RTC in the scheme for the recognition of QE, but further practice -specific courses (including the specialized training

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GUIDANCE - ANNEX I

3. Development and Implementation of the National E&T Programme

Module	Content
1. **The Radiation Protection Officer (RPO)**	**Introduction to the International Basic Safety Standards** Brief overview of objectives, scope & structure of BSS Terminology: facilities, activities, practices; exposure situations (planned, existing, emergency); exposure groups (occupational, medical, public) **The RPO** Definition, role, duties
2. **Basic nuclear physics**	**Atomic structure** Protons, neutrons and electrons; periodic table; atomic mass; isotopes of an element; excitation, ionisation; characteristic x-rays, bremsstrahlung; radiation, energy
	Radioactivity Nuclear stability; unstable nuclei; radionuclides; radioactive decay, alpha, beta, gamma, neutrons; table of radionuclides; activity; law of radioactive decay; half-life; decay chains and equilibrium
	Interaction of radiation with matter Properties of alpha, beta, gamma, X ray, bremsstrahlung radiation, ionisation
	Practical Demonstration: Alpha, beta and gamma radiation – range in air and suitable shielding material.
3. **Quantities and units**	**Radiation quantities** Activity, absorbed dose, equivalent dose, effective dose, dose rate, committed effective dose
	Radiation units Becquerel, Gray, Sievert
4. **Sources of radiation exposure**	**Natural radiation** Terrestrial radionuclides, uranium and thorium decay chains, radon
	Man-made radiation Production of radioisotopes, sealed sources, unsealed sources, radiation generators (x-ray sets, accelerators), common uses of radiation (e.g.: Industrial radiography, Industrial irradiators, process control gauges, radiotracers; well logging; diagnostic and interventional radiology; nuclear medicine; radiotherapy)
5. **Biological effects of ionising radiation**	**Effects of radiation on cells**

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GUIDANCE NAT. STRAT. ON E&T

CONTENTS

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GUIDANCE - ANNEX II

Stakeholders	Policy framework	Output 1: National strategy for E&T established	Assessment of education and training needs	Output 2: E&T needs assessed	Design of the national E&T programme	Output 3: Schedule of activities to meet the E&T needs	Development and implementation of the national E&T programme	Output 4 : infrastructures Competence built in support of national radiation safety	Evaluation of the national E&T programme	Output 5: National E&T programme continuous to be effective and up to date
Government	Action 1 Action 3		Action 4				Action 16			
Regulatory body	Action 2		Action 4 Action 7				Action 12 Action 13 Action 14			
Professional bodies and associations	Action 2		Action 6		Action 9		Action 15			
Education and training providers	Action 2		Action 5		Action 9		Action 15 Action 17			
National Committee	Action 2		Action 8		Action 10 Action 11				Action 18 Action 19	
	Action 20									

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COOPERATION PROJECTS

Technical Cooperation Regional Projects on E&T

"Strengthening the Education and Training Infrastructure and Building Competence in Radiation Safety"

Africa : RAF9048

Europe : RER9109

Asia and the Pacific : RAS9066

Latin America : RLA9070-9075

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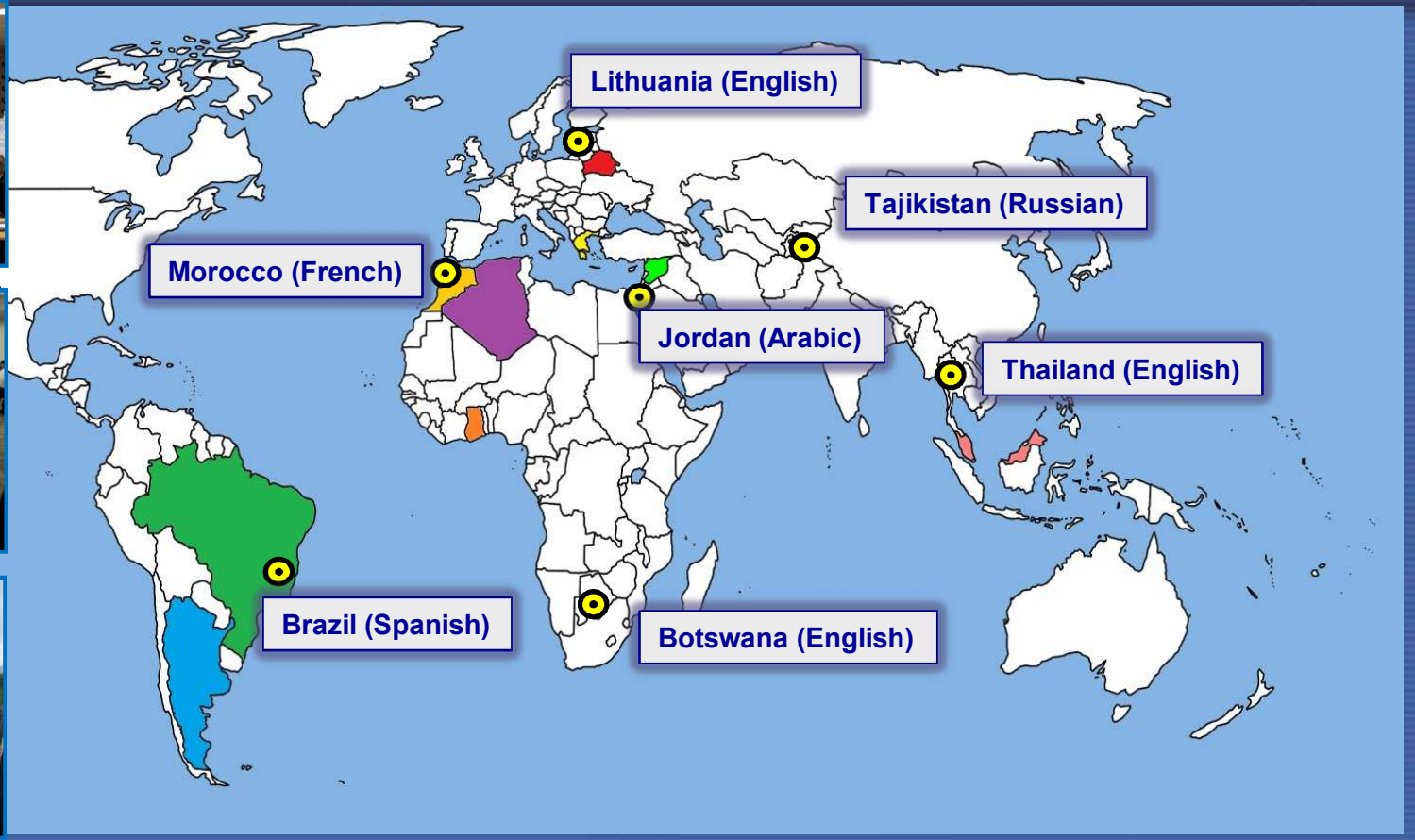
Regional Workshops on National Strategies 2012



7 Regional workshops; 118 participants from 83 Member States

- *The guidance to establish a National Strategy for E&T has been disseminated among MSs*
- *Preliminary information collected by MSs*

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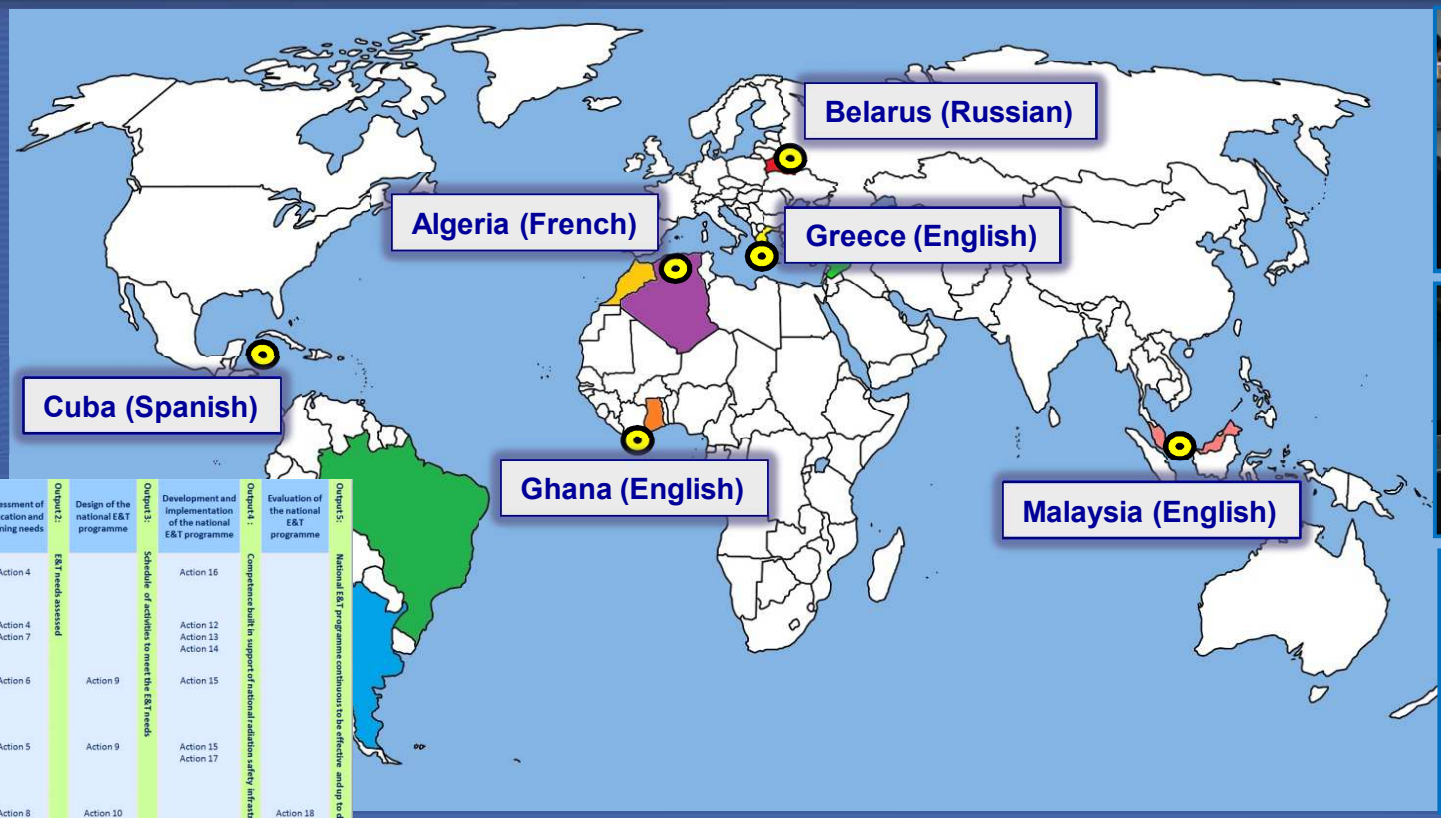
Regional Workshops on National Strategies 2013



Stakeholders	Policy framework	Output 1: National strategy for E&T established	Assessment of education and training needs	Output 2: E&T needs assessed	Design of the national E&T programme	Output 3: Schedule of activities to meet the E&T needs	Development and implementation of the national E&T programme	Output 4 : Competence built in support of national radiation safety infrastructures	Evaluation of the national E&T programme	Output 5: National E&T programme continuous to be effective and up to date
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Action 20

6 Regional workshops; 108 participants from 88 Member States

- *MSs that attended the previous workshop reported back on progress made*
- *Action Plans were drafted to establish a National Strategy for E&T*

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Take home points

- The establishment by Member States of a national strategy for E&T in radiation safety is one of the main challenges that MSs will face to build sustainable capacity, in compliance with relevant IAEA Safety Standards
- For that purpose IAEA has developed a guidance and supports MSs through technical cooperation projects.
- Future work of IAEA will include monitoring the progress made and analysing challenges faced and difficulties encountered, in order to identify possible solutions to be rendered to MSs (e.g. new workshops planned for 2014)

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E&T - Division of Radiation, Transport and Waste Safety

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Education and Training in Radiation, Transport and Waste Safety

Building competence through education and training in radiation safety is fundamental to the establishment of a comprehensive and sustainable national infrastructure for radiation safety, which in turn is essential for protecting people from the harmful effects of radiation. In order to establish a sustainable education and training infrastructure in radiation, transport and waste safety, Member States should develop a national strategy for building competence through education and training , based on the approach provided in the Safety Guide "Building Competence in Radiation Protection and the Safe Use of Radiation Sources".

The national strategy is based on 4 interlinked phases, where the outcome of one phase is the starting point for the next phase.The design and development of an education and training programme for a national strategy requires the organization of training courses in radiation protection. IAEA Safety Reports Series No. 20 "Training in radiation protection and the safe use of radiationsources" provides trainers and training organization with information on and examples of training methods and materials that have proven to be effective in use with appropriate target audiences.

Resources

- Educational and training material
- Education and Training Appraisals (EduTA)
- Newsletter No. 1

http://goto.iaea.org/rtws-E&T

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Thank you for your attention

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