

International Atomic Energy Agency

**The Global Safety Assessment Network
GSAN**

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What is the Global Safety Assessment Network (GSAN)?



The screenshot shows the homepage of the Global Safety Assessment Network (GSAN). At the top, there is a navigation bar with the IAEA logo and the text "IAEA | GSAN Global Safety Assessment Network". A search bar is located on the right side of the navigation bar. Below the navigation bar, there is a main heading "Welcome to the Global Safety Assessment Network (GSAN)". A large banner image shows a group of people wearing red hard hats in an industrial setting. The banner text reads "Activities: Access the collaboration areas and information on projects, meetings and workshops." Below the banner, there is a link "Learn more about SAS Activities". The page is divided into three main sections: "Latest News", "GSAN Registration", and "GSAN Feedback".

Latest News

- EC Funded Projects - PUI**
Within the scope the Peaceful Uses Initiative, the Department of Nuclear Safety and Security of the IAEA is currently conducting a series of new projects with funding from the European Commission.
- Education and Training Videos**
New video material on different areas of the Safety Assessment Education and Training (SAET) Programme is now available in the GSAN Multimedia Library.
- Defence in Depth Concept Explained**
Hussam Khartabli, Senior Safety Officer of the Safety Assessment Section of the Division of Nuclear Installation Safety, explain the concept of Defence in Depth.

GSAN Registration

benefits of registering

register now!

If you need help with the registration [click here](#).

GSAN Feedback
Tell us what you think: [GSAN Feedback](#).

<http://gsan.iaea.org>

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Global Safety Assessment Network (GSAN) Objectives

- Provide information on IAEA Safety Assessment activities and services.
- Facilitate a collaborative safety assessment programme linking experts worldwide
- Support global nuclear safety harmonization and capacity building in countries expanding and developing nuclear programmes



GSAN Offers:



- Information and materials for Member States on design safety and safety assessment for capacity and competency building
- Sharing of safety assessment knowledge and experience including analytical and experimental information.
- Facilitation of collaboration among Member States on validation and improvement of safety assessment methods.

Global Safety Assessment Network (GSAN)

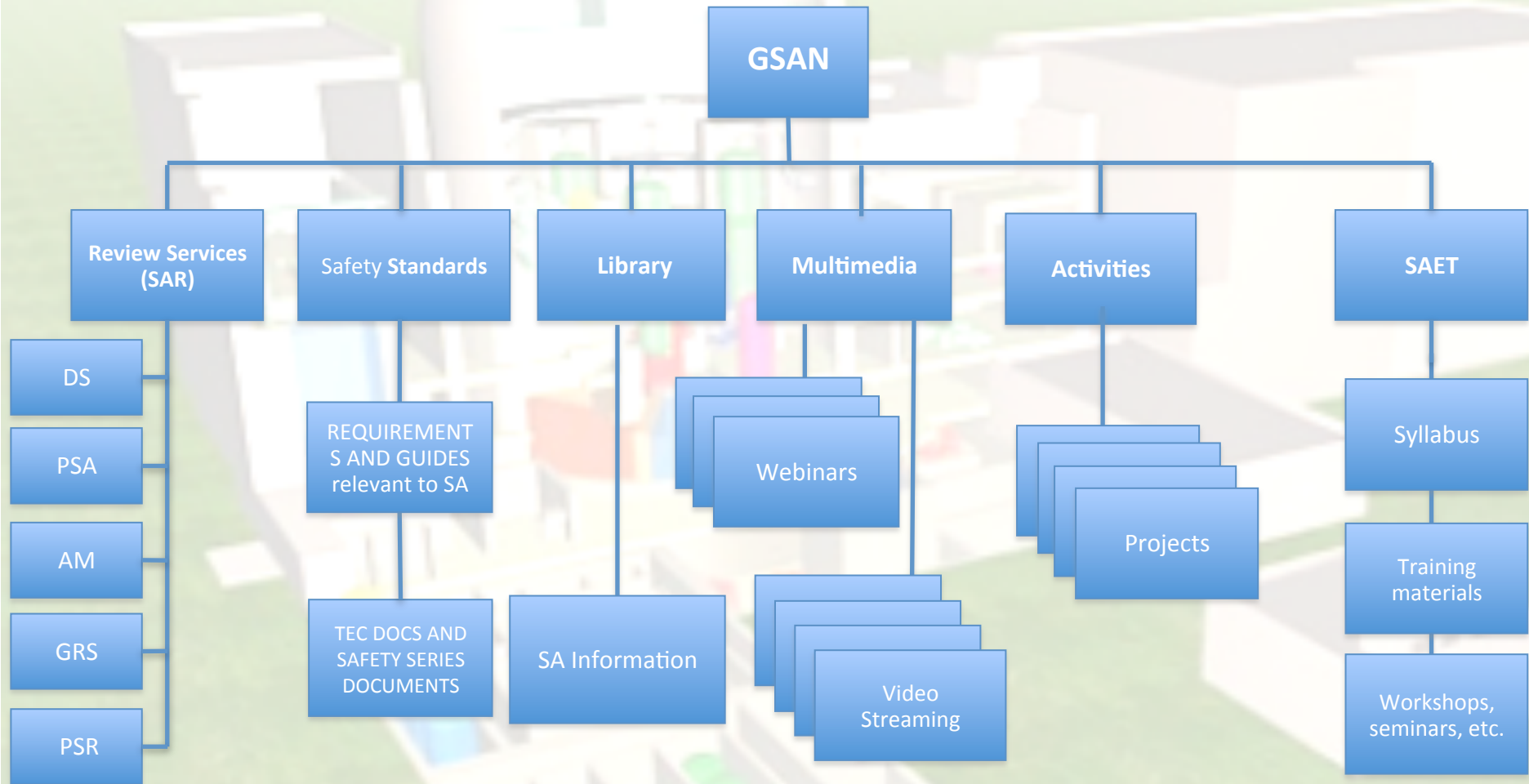
Main Areas

- Review Services - description of the SAR Services
- Safety Standards - related to safety assessment and design safety
- Library of IAEA Safety Standards, TecDocs, and other reports and documentation
- Multimedia Area (for registered users) – for training and knowledge sharing among experts (includes Webinars)

Global Safety Assessment Network (GSAN) Main Areas (cont' d)

- Activities - collaboration areas available to project members only
- Safety Assessment Education and Training Programme - the SAET Syllabus (collaboration areas for training material development available to project members only)

Global Safety Assessment Network (GSAN) Structure



Benefits of Joining the Network GSAN


- News and information on safety assessment activities and IAEA Safety Standards & technical documents related to safety assessment;
- Secure collaboration platform for conducting projects and exchanging information in the field of safety assessment;
- Safety Assessment Education and Training (SAET) area, that provides a detailed modular Syllabus for use in safety assessment training;
- Multimedia Area with Webinars on nuclear safety topics (registration needed) and video streaming of training series;
- Your Feedback on GSAN for continuous improvement of the network.



Registration for GSAN

A few clicks away

1. Go to GSAN.iaea.org
2. Click on GSAN Registration
3. Follow instructions to register for IAEA NUCLEUS and then GSAN



**Safety assessment competence
is the key to
making the right decisions
in design, licensing and operation.**

SAFETY ASSESSMENT CAPACITY BUILDING



**The IAEA has designed
a complete and
sustainable capacity
and competency
building programme
in safety assessment
knowledge and
practical applications
SAET and GSAN**

SAET

The Safety Assessment Education and Training Programme (SAET) was established and launched in 2009 as a systematic programme for training of regulatory and operational staff in the skills needed for informed decision-making and technical review of NP documentation.



Safety Assessment Education and Training (SAET) Programme

SAET Programme Objective:

Support Member States in building and maintaining independent safety assessment competency and capacity

SAET objective is accomplished through:

- Identifying safety assessment knowledge requirements
- Training materials based on Safety Standards for instructor-led courses
- Training workshops and courses
- Using web-based training tools
- International collaboration on safety assessment projects



Safety Assessment Education and Training (SAET) Programme

The structure of the programme is built on two main pillars:

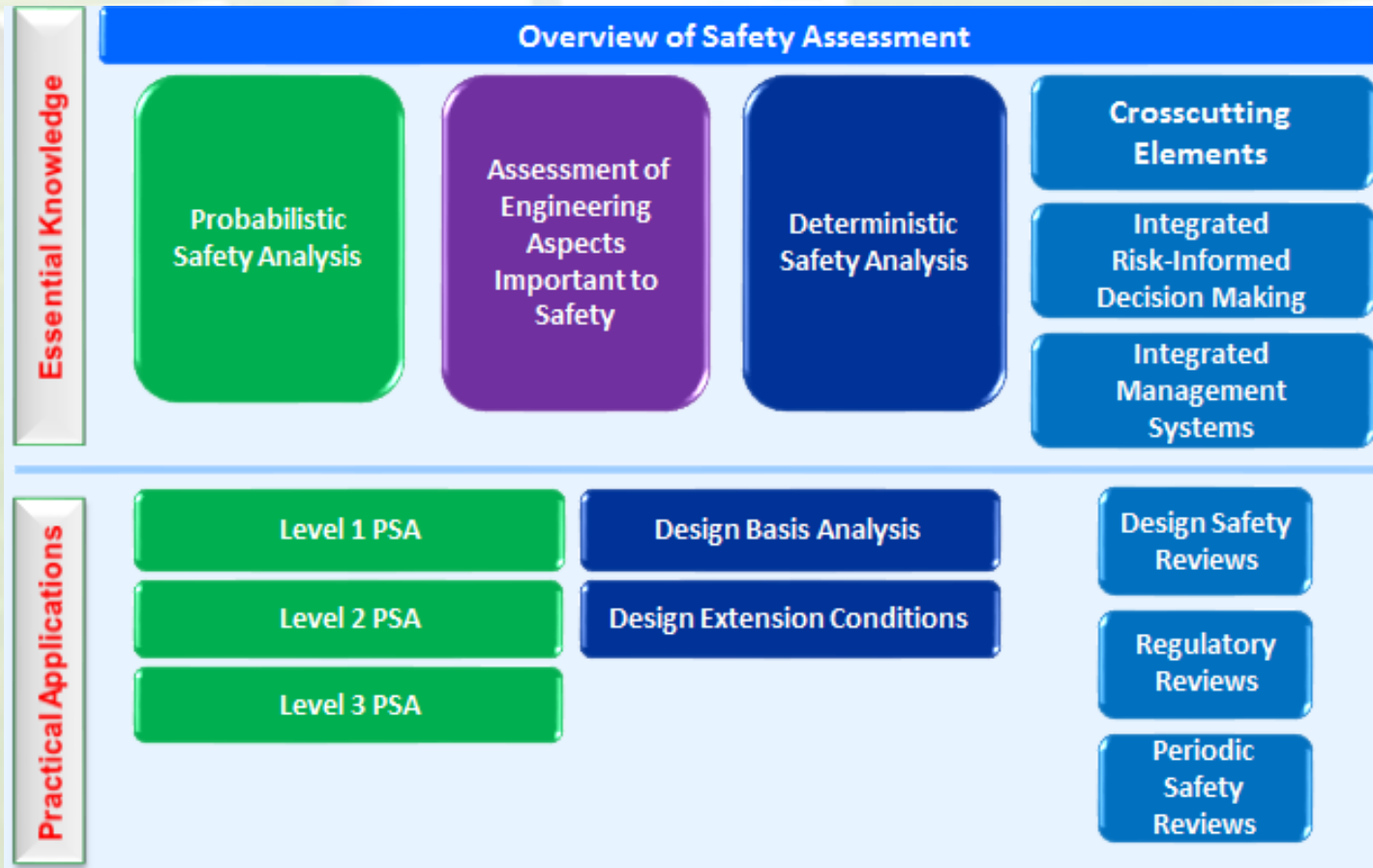
- **Essential Safety Assessment Knowledge**
- **Practical Applications**

The *Main Elements* of the Programme are:

- I. Fundamentals of Safety Assessment**
- II. Assessment of Engineering Aspects Important to Safety**
- III. Deterministic Safety Assessment**
- IV. Probabilistic Safety Assessment**



SAET Structure



Safety Assessment Education and Training (SAET) Programme

- ***The SAET Syllabus Outline*** presents the structure of the training programme for bought pillars and for all Main Elements.

Each Main Element consists of a number of ***Modules***.

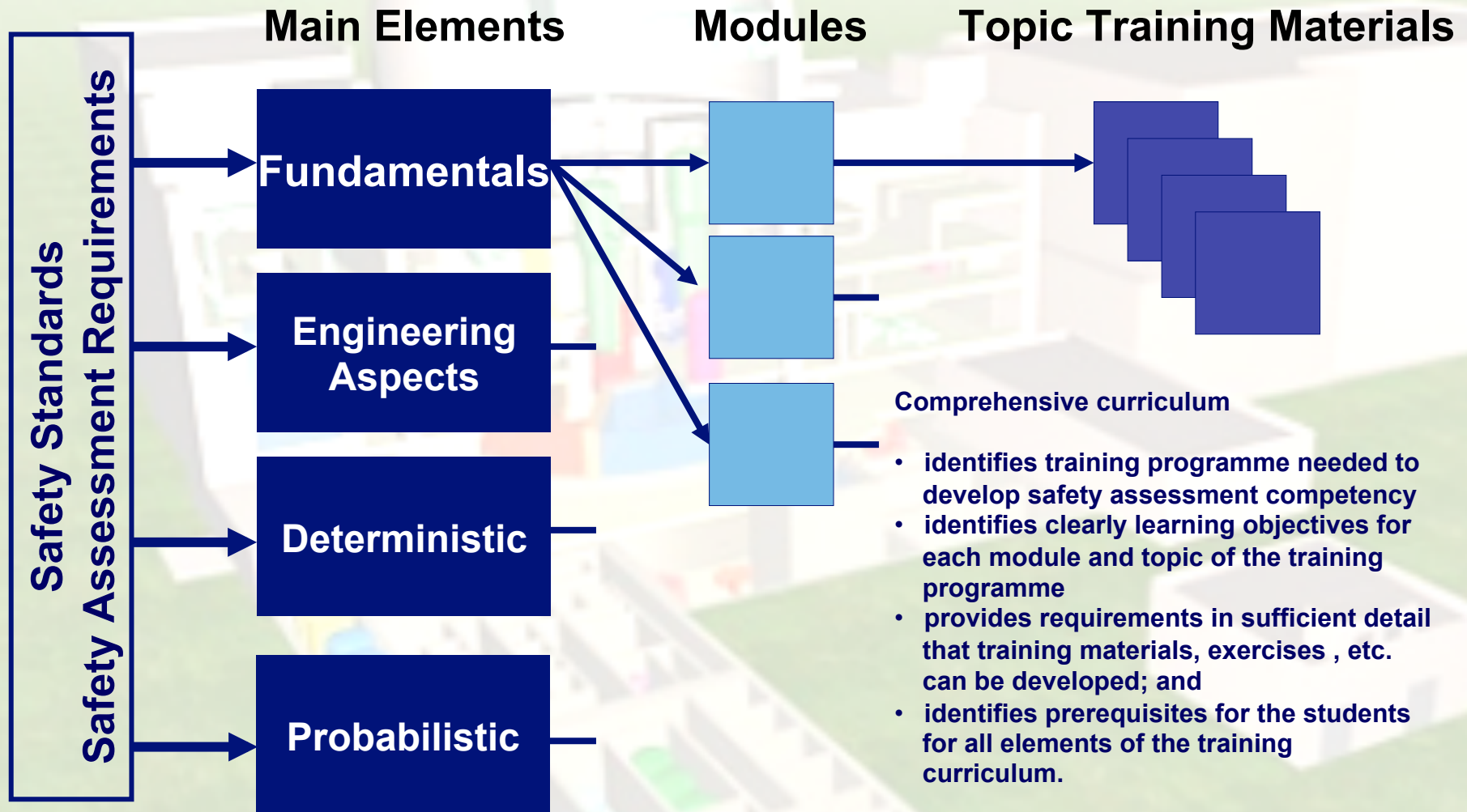
- ***The SAET Curriculum***

- defines the ***learning objectives and the required content*** for the Modules
- identifies the ***Topics*** to be addressed in each Module
- defines the required format and content of the ***Topic Training Materials***

- ***The Topic Training Materials*** are being developed by the IAEA with support from international experts.



SAET Curriculum



Building Capacity and Competency in Safety Assessment



SAET Essential Knowledge Programme

- **Develops understanding and comprehension of:**
 - **The structure of IAEA Safety Standards**
 - **The design safety and safety assessment requirements**
 - **Fundamentals of engineering aspects important to safety, deterministic and probabilistic safety analyses, and practical applications of like review of the Safety Analysis Report (SAR)**
 - **The concept of integrated risk informed decision making**
 - **Deterministic and probabilistic safety analysis methodology through practical applications and technical exercises**

The content of this programme is based on IAEA Safety Standards

SAET Syllabus Outline (work in progress)

MAIN ELEMENTS			
I. Fundamentals of Safety Assessment*	II. Assessment of Engineering Aspects Important to Safety*	III. Deterministic Safety Assessment*	IV. Probabilistic Safety Assessment*
Essential Safety Assessment Knowledge			
MODULES	MODULES	MODULES	MODULES
<p>A – Introduction to Safety Assessment</p> <ol style="list-style-type: none"> 1. Fundamental Safety Principles and overview of IAEA Safety Standards 2. Safety Requirements: Safety Assessment GSR Part 4 and Design Safety SSR-2/1 3. Basic Safety Concepts 4. Scope of Safety Assessment <p><i>Note:</i></p> <p><i>For additional training in nuclear safety fundamentals, please refer to the IAEA Basic Professional Training Course on Nuclear Safety (BPTC) at:</i></p> <p>http://www-ns.iaea.org/training/ni/fund-bpc.asp?s=100&l=105</p>	<p>A – Overview of Engineering Aspects</p> <ol style="list-style-type: none"> 1. Implementation of defence in depth 2. Operational experience 3. Radiation protection 4. Classification of structures systems and components 5. Equipment qualification 6. Aging and wear-out mechanisms 7. Human factors in NPP design and operation 8. Protection against internal fire and explosions 9. Protection against internal hazards other than fire and explosions 10. Protection against earthquakes 11. Protection against external events excluding earthquakes 	<p>A – Overview of Deterministic Safety Assessment (DSA)</p> <ol style="list-style-type: none"> 1. Deterministic Safety Assessment 2. Scope of Deterministic Analysis 3. Overview of DSA Applications 4. Licensing Analyses 5. Development of EOPs and SAMGs 6. Safety Analyses in Support of Periodic Safety Reviews 7. Shut-down and Low Power Analyses 8. Analyses in Support of Modifications and Life Extension 	<p>A – Probabilistic Safety Assessment (PSA)</p> <ol style="list-style-type: none"> 1. Basic Risk Concepts and Techniques 2. General Objectives and Scope of PSA 3. Overview of Level 1, 2, and 3 PSAs 4. Level-1 PSA organization, management and tasks outline 5. Level 2 PSA Process - Major Tasks & Interfaces and Project Arrangements 6. Role of PSA concepts in Risk Informed Regulations 7. Safety Assessment and Verification with Level 1 PSAs 8. Overview of PSA Applications and Regulatory Use of PSAs 9. Living PSAs and Risk Monitors



SAET Practical Applications Programme

- **The SAET Practical Application (PA) Programme is designed for development of analytical skills in deterministic and probabilistic safety analyses.**
- **The SAET PA Programme provides:**
 - **Training materials**
 - **Access to specific computer codes**
 - **Specialized courses per request**
- **It facilitates international collaboration through safety analysis exercises and information exchange.**

SAET Syllabus Outline

(work in progress)

MAIN ELEMENTS			
I. Fundamentals of Safety Assessment*	II. Assessment of Engineering Aspects Important to Safety*	III. Deterministic Safety Assessment*	IV. Probabilistic Safety Assessment*
MODULES	MODULES	MODULES	MODULES
Practical Applications Skills			
<p><i>A - Crosscutting Topics</i></p> <p>1. Integrated Risk-Informed Decision Making (IRIDM)</p> <ul style="list-style-type: none"> • Relation between DSA and PSA • IRDM Framework • Integrated use of DSA and PSA • IRDM and regulatory applications <p>Integrated use of DSA and PSA</p> <ul style="list-style-type: none"> • IRDM and regulatory applications <p>2. Periodic Safety Review</p> <ul style="list-style-type: none"> • Periodic Safety Review within the Regulatory Framework • Methodology and Guidelines used for Performing PSR • PSR Conduct • Current Experience with PSR <p>3. Design Safety Reviews – evaluation of Safety Cases</p> <ul style="list-style-type: none"> • Generic Reactor Safety Review 	.	<p><i>A - Design Basis Analysis</i></p> <p>1. Typical architecture of thermal-hydraulic system codes</p> <p>2. Modelling principles using thermal-hydraulic system codes</p> <p>3. Description of thermal-hydraulic system codes structure and syntax</p> <ul style="list-style-type: none"> - Hydrodynamic - Heat structures - Balance of plant - Neutron kinetics - Time step control - Output files - Post processing <p>4. Component models of thermal-hydraulic system codes</p> <ul style="list-style-type: none"> - General - volume, junction, pipe, branch, cross flow - Specialized – valve, pump, accumulator, pressurizer, separator, ECC mixer, turbine 	<p><i>Level 1 PSA</i></p> <p>(TO BE COMPLETED)</p> <ol style="list-style-type: none"> 1. Use of PSA Codes 2. Evaluation of Uncertainties 3. Presentation of Results

Example of a SAET Curriculum Module

I. Fundamentals of Safety Assessment

Module A: Introduction to Safety Assessment

Background and Scope: Fundamental Safety Principles require assessment of safety for all facilities and activities that potentially give rise to radiation risks. The module provides the background and basic knowledge of requirements, processes and methods used in safety analyses. IAEA Safety Standards pertaining to safety analyses are discussed and interpreted.

Learning Objective: To understand background of safety analysis and to obtain general knowledge necessary for performance of efficient, focused and adequate safety analyses or to gain knowledge basis for review of safety analyses. This includes understanding of safety concepts and safety criteria, and familiarization with the role, the scope and the processes of safety analyses To become familiar with IAEA Safety Standards, especially Fundamental Safety Principles and Requirements for Safety Assessment.

Courses of this module of the SAET Programme provide for introductory and preparatory knowledge necessary for regulatory and TSO personnel engaged in safety analysis performance or reviews.

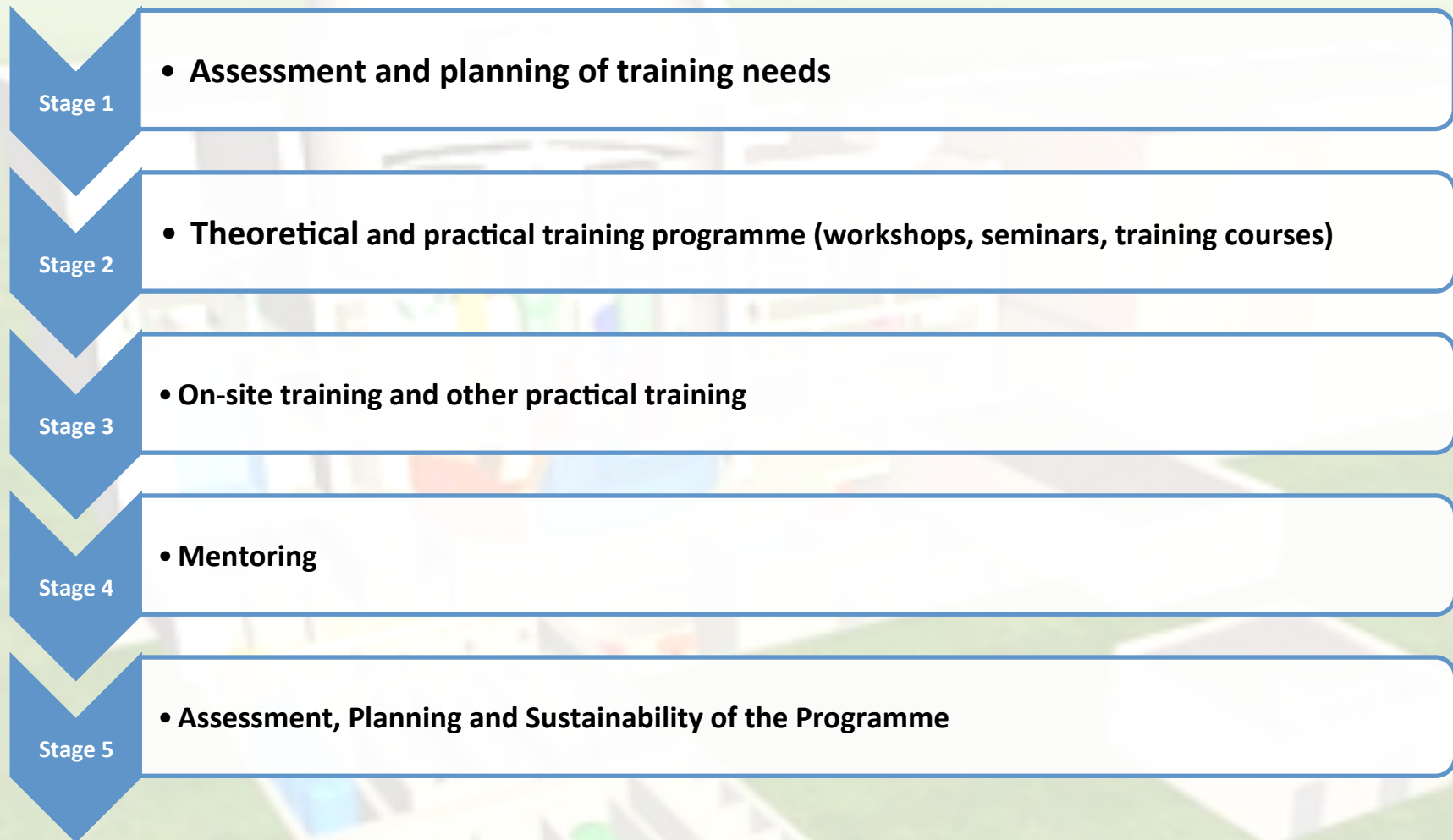
Applicable Principal Safety Standards: IAEA Safety Standards, Fundamental Safety Principles, Safety Fundamentals No. SF-1, International Atomic Energy Agency, Vienna 2006; IAEA Safety Standards Series, Safety of Nuclear Power Plants: Design, Requirements, No. NS-R-1, International Atomic Energy Agency, Vienna 2000; IAEA Safety Standards, Safety Assessment of Nuclear Facilities and Activities, Draft Requirements, DS348, International Atomic Energy Agency, Vienna 2007.

Content: This SAET Programme module consists of the following courses:

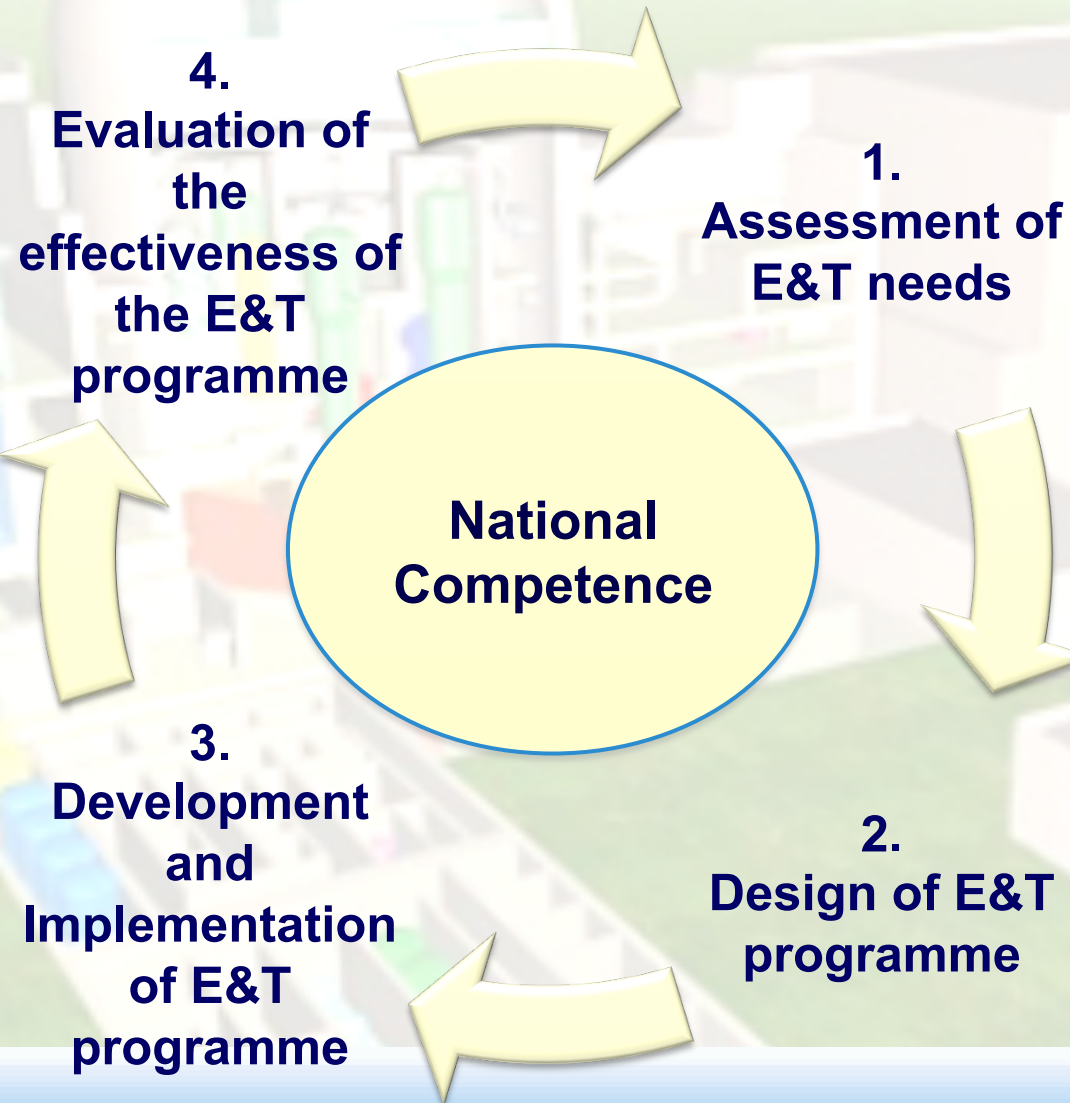
1. Fundamental Safety Principles and overview of IAEA Safety Standards
2. Safety Requirements: Safety Assessment GSR Part 4 and Design Safety SSR-2/1
3. Basic Safety Concepts
4. Scope of Safety Assessment

Requirements and Pre-requisites: Advanced nuclear or mechanical engineering degree.

Implementation Strategy



Framework for building competences through education and training

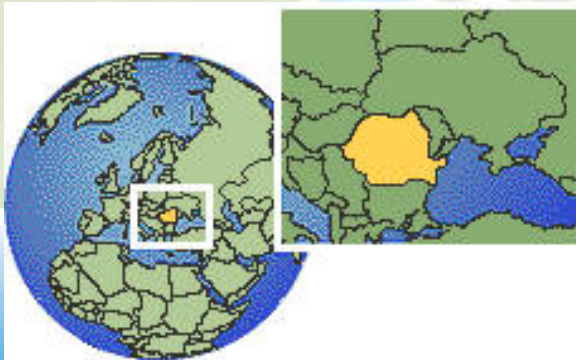


A HISTORY OF GSAN SUPPORT ACTIVITIES:

Building Competences through Education and Training

II. The Norway Grants Programme for Romania and Bulgaria (Norwegian EBP funding) (completed) (2010-2011)

- A multi-topic programme containing projects in safety assessment as well as a variety of other areas (e.g. management systems, safety culture, emergency response)
- Further progress was made in delivering education and training through GSAN Support Activities
- Knowledge management for sustained training
- Needs of two different Member States addressed
- Results and methods included in IAEA Safety Assessment framework for all MS (Benefits back to IAEA)



A HISTORY OF GSAN SUPPORT ACTIVITIES: Building Competences through Education and Training

III. The NOKEBP for Strengthening Nuclear Safety Assessment Competence (Norwegian EBP funding) – **ongoing** (2011-2013)

- **The aim of this Norwegian-funded pilot programme is:**
 - ✓ to enhance independent, technically justified, safety decision making capacity at IAEA Member States launching nuclear energy programmes
 - ✓ to develop and implement safety assessment competency building features within the GSAN framework



Benefits to Member States:

- Improved GSAN Knowledge Network for safety assessment information and capacity building
- Development of new SAET Modules
- Further progress in delivering education and training through GSAN Support Activities



The Programme Contains Three Projects

Project 1: Education and Training - Development of Knowledge and Skills Requirements (SAET Syllabus development)

Project 2: The Global Safety Assessment Network (GSAN) - Developing an Effective Network and Platform

Project 3: Pilot Programmes - Strengthening Safety Assessment Capabilities in Selected IAEA Member States

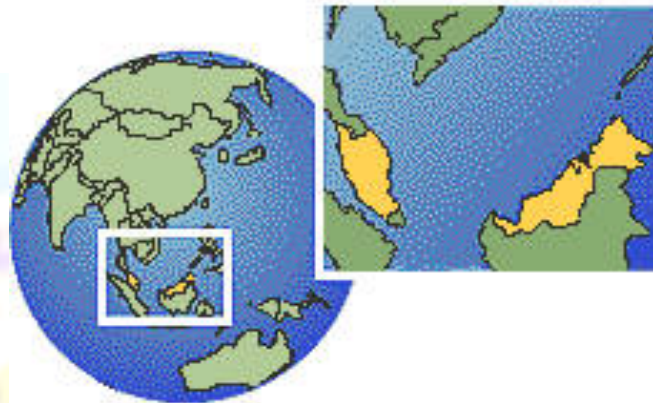
Work in participating Member States will serve as a model for addressing the needs of other newcomer countries with respect to capacity building and harmonization of safety assessment approaches and knowledge.



COUNTRIES SELECTED FOR THE PILOT PROGRAMME



Two countries requiring a programme of development and representing different needs and stages of nuclear power programme development were selected.



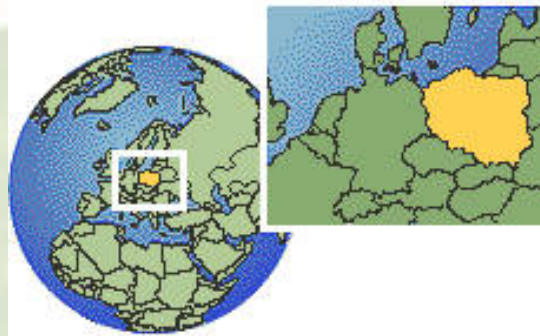
Vietnam and Malaysia joined the Pilot Programme in 2010



A HISTORY OF GSAN SUPPORT ACTIVITIES:

Building Competences through Education and Training

- IV. EC Funded Programme for JNRC (Jordan)
Introduction to Safety Assessment
(**ongoing**) (2012-2013) – applying SAET
- V. US GSAN – Practical Applications for
Poland's Nuclear Research Institute
(2011-2013)
- VI. Peaceful Uses Initiative (PUI) –
(SAAP Pilot 2013)



The Safety Assessment Competency Evaluation Methodology

“Establishing the Competence Needs for Safety Assessment Within an Organization”

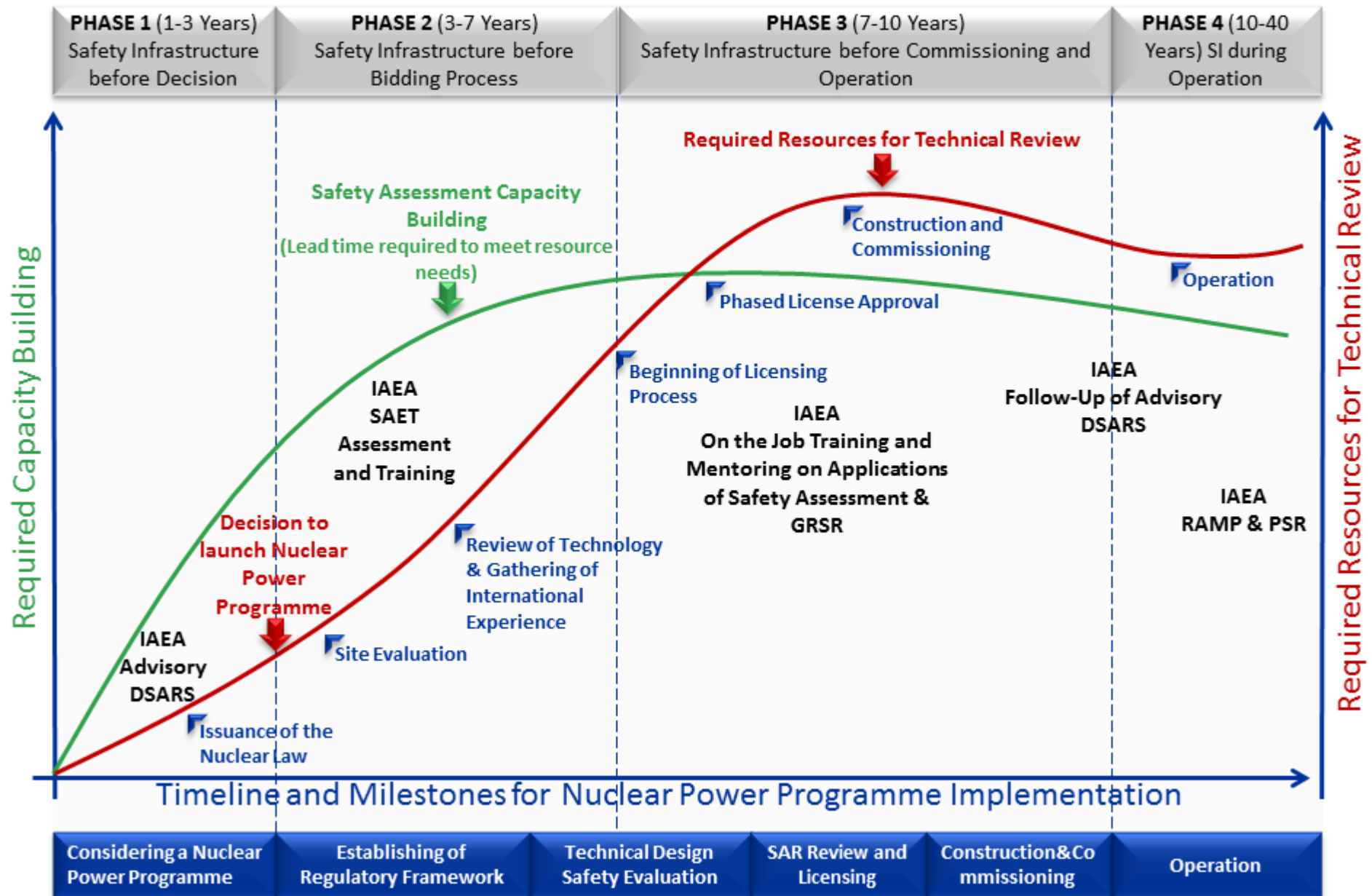
To assist Member States in evaluating their needs in the area of safety assessment this new methodology was developed in 2012 and will be piloted through the Peaceful Uses Initiative in 2013-14.

It is an integral part of the New DSARS Advisory for Newcomers: the Safety Assessment Advisory Programme (SAAP).



Essential Safety Assessment Capacity building for Technical Review Requirements

For Regulatory Body (w. SSG-16 Phases)



GSAN SUPPORT ACTIVITIES

SUMMARY

- **The GSAN fosters focused collaboration on safety assessment capacity and competence building in support of global nuclear safety harmonization, especially in the expanding and developing nuclear programmes worldwide.**
- **The SAET provides a systematic approach for evaluating safety assessment competence and for training regulatory, operational and technical support staff in the skills needed for informed decision-making and technical review of NPP documentation.**

GSAN Support Activities assist IAEA Member States to develop the knowledge and skills necessary for making the right decisions in NPP design, licensing and operation.



International Atomic Energy Agency



...Thank you