



**PROJECT FOR SHARING & GROWING NUCLEAR SAFETY CULTURE
COMPETENCE**

NUSHARE

PART B

**Funding Scheme
Coordination and Support Actions
Supporting (CSA-SA)**

Work Programme Topics addressed

Named Beneficiary Action in favour of ENEN: Training and Information programme, drawing the lessons from Fukushima in all areas of Nuclear Fission and Radiation Protection

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Abbreviations and Acronyms

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List of participants

| Participant no. | Participant organization name | Participant short name | Country |
|---------------------------------|---|-------------------------------|----------------|
| 1 (Coordinator) | European Nuclear Education Network Association | ENEN | France |
| Third Parties under ENEN | | | |
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| TP1 Third Party under ENEN | Institut National des Sciences et Techniques Nucléaires, Commissariat à l'Energie Atomique et aux Energies Alternatives (CEA) | (ENEN) INSTN | France |
| TP2 Third Party under ENEN | Universidad Politecnica de Madrid | (ENEN) UPM | Spain |
| TP3 Third Party under ENEN | TECNATOM | (ENEN) TECNATOM | Spain |
| TP4 Third Party under ENEN | ISaR Institute for Safety and Reliability | (ENEN) ISAR | Germany |
| TP5 Third Party under ENEN | ENS, European Nuclear Society | (ENEN) ENS | Belgium |
| TP6 Third Party under ENEN | INBEX, Institute for Nuclear Business Excellence | (ENEN) INBEx | Sweden |
| Subcontractor | | | |
| Subcontractor | Organization name | Short name | Country |
| SC1 | European Nuclear Safety Training and Tutoring Institute | ENSTTI | France |
| SC2 | WFSJ, World Federation on Science Journalists | (ENEN) WFSJ | Canada |

1 Project Description

1.1 Background and objectives

The NUSHARE project (PROJECT FOR SHARING & GROWING NUCLEAR SAFETY CULTURE COMPETENCE) originated as a Euratom Education, Training and Information (ETI) initiative proposed by the Cabinets of Commissioner Mrs Máire Geoghegan Quinn (Research and Innovation) and Commissioner Mr Günther Oettinger (Energy) after the Great East Japan Earthquake on 11 March 2011. This initiative is in collaboration with DG ENER and DG JRC as well as DG EAC and DG DEVCO. It is a "Support action" of 4 years duration, launched under the modified Euratom work programme 2012 (adopted on 25 June 2012) through a "grant to named beneficiary" (=ENEN association - <http://www.enen-assoc.org/>) and expected to start early 2013.

The objective of NUSHARE is to develop and implement Education, Training and Information (ETI) programmes aimed at strengthening safety culture¹ in the nuclear sector and at sharing relevant best practices at the European level. Special attention is paid to safety culture competences² in nuclear power plants and other nuclear installations, but other nuclear activities and security culture aspects will also be treated.

The continuous strengthening of the nuclear safety culture is indeed a key concern of policy makers and industry, as it is demonstrated e.g. in the Euratom "Nuclear Safety Directive" (EU Council, Brussels, 23 June 2009), currently under revision: "Whereas ... (19) The establishment of a strong safety culture within a nuclear installation is one of the fundamental safety management principles necessary for achieving its safe operation" (see also Section 1.1.2). It is worth noting that safety culture is an issue in most of the power generation technologies, as it is stressed e.g. in the Ethics report of the "2012 Interdisciplinary Study" (excerpt in footnote 3).

In their starting phase, the proposed ETI programmes will preferably address "learners" at higher education level (according to a "train-the-trainer" or "inform-the-multipliers" approach) and deliver programme contents of EU-wide interest, generally given in English. Country specific applications (also

¹ In accordance with IAEA Glossary (2007) nuclear safety culture is generally defined as: "that assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, protection and safety issues receive the attention warranted by their significance." More recently and with special regard to the application in the nuclear industry, safety culture has been defined more specifically as: "the core values and behaviours resulting from a collective commitment by leaders and individuals to emphasize safety over competing goals to ensure protection of people and the environment" (US NRC, Safety Culture Policy Statement, December 2012, and INPO, Traits of a Healthy Nuclear Safety Culture, April 2013)

² In this document the term "safety culture competence" is understood as ability of nuclear stakeholders (individuals and organisations) to apply that set of knowledge, skills and attitudes within the relevant scope of their activities which is required for achieving excellence in safety culture. Safety culture competence is built on a common ground of abilities relevant for various types of stakeholders and on specific abilities depending on the stakeholder's roles in nuclear applications and their control.

³ Excerpt of the "Ethics Opinion n°27", dated 16/01/2013 (p 59) – Section 3.6.4 Safety:

*"Reducing the risks down to purely technical aspects would not fulfil the requirement for an integrated approach and comprehensive assessment. Consequences in terms of the environment and health should receive the same amount of attention as the cultural, social, economic, individual and institutional implications. A **safety culture** embraced by governments and operating organisations is necessary in the production, storage and distribution of energy in maintaining a low level of risk."*

2012 Study - <http://www.eesc.europa.eu/?i=portal.en.events-and-activities-symposium-on-nuclear-fission-forum>

in national languages) will then follow in a natural way.

For the sake of clarification, education and training (E&T) are defined as follows:

- Education is a basic or life-long learning process providing broader and more fundamental competences than training. Education focuses on conveying basic knowledge and fundamental attitudes encompassing the need to maintain the underlying foundations and basic competences across generations.
- Training involves acquiring a specific competence required to properly perform a well-defined function or a job, usually to an established standard. Training focuses on building job-related skills and attitudes encompassing the need to act effectively according to recognized professional practices.

The impact, more commonly understood as the future success criteria, will be mainly directed in three areas:

1. The further strengthening of nuclear safety and security, including (international) emergency preparedness and crisis communication;
2. The dissemination of a common nuclear safety culture of very high level throughout Europe, with particular emphasis on the human and organisational elements,
3. The extension of the basic understanding of these and related topics beyond the nuclear community (e.g. knowledgeable non-nuclear specialists including the medical community, Europarliament or national Parliaments members, journalists, etc).

To achieve the main objective of the project, and to ensure its long term impact on a safe and secure application of nuclear energy in the EU member states, a timely, broad, result driven and quality focused approach is proposed. The ETI programmes to be developed will consider, in particular, lessons learned from the Fukushima accident as well as topics related to safety culture identified by the "Stress Tests" (EU Council in March 2011: "Targeted reassessments of the safety margins of NPPs in the light of the Fukushima events" – see EC DG ENER website: http://ec.europa.eu/energy/nuclear/safety/stress_tests_en.htm⁴). Special attention will be given to the specific national needs of different EU Member States with nuclear installations on their territory.

First phase: Development of concepts and basic programmes (NUSHARE ETI Catalogue and Action Programme)

Three groups of “learners” are targeted:

- Target Group 1: Policy decision makers and opinion leaders (see section 1.1.1) at the level of national or regional governments, parliaments, international organisations (including EC), scientific communities (including relevant medical specialists) involved in crisis

⁴ At the time of the finalization of the present document, some of the links of this website point to outdated versions of Commission papers on the lessons learned from stress tests. This has been drawn to the Commissions attention by the European Nuclear Energy Forum (ENEF), and it is expected that corrected versions will be made available on the same site.

management as well as journalists and other opinion leaders;

- Target Group 2: Nuclear Regulatory Authorities and Technical Safety Organisations⁵ (see section 1.1.2) at the level of staff members of those organisations;
- Target Group 3: Electric utilities and systems suppliers (see section 1.1.3) at the level of responsible personnel, in particular managers, of organizations operating nuclear facilities (electric utilities) and of suppliers of such facilities (vendors, engineering companies).

In this first phase, the project will

- establish the status of existing ETI programmes in EU member states which may contribute to achieve the NUSHARE objectives, and
- identify those priorities for possible new actions under the NUSHARE umbrella which are expected to provide most added value compared to the current status, taking the available financial resources of the project into account.

Advantage should be taken of existing Euratom FP7 research and training actions wherever reasonable. On this basis a set of ETI programmes (e.g. training courses provided by academic and/or industrial organizations) contributing to achieving NUSHARE objectives and suitable for EU-wide applications will be established. This includes the definition of learning objectives and learning outcomes⁶ to be achieved with these programmes for the relevant target groups and subgroups and the development of a sound concept for application in different EU Member States. Required and available resources (both internal and external) will be reviewed and appropriate organisations and individuals (e.g. training organizations and trainers) will be identified who can contribute to the implementation, validation and dissemination of the NUSHARE ETI programmes.

“Stakeholders’ Seminar” planned at the end of the first phase

Particular attention will be paid to involving a significant number of stakeholders (in the EU and also from non-EU countries and from international organisations) committed to the NUSHARE objectives with the aim of expanding the knowledge base contributing to the project, strengthening the capabilities and the infrastructure for implementation, validation and dissemination of NUSHARE ETI programmes, and articulating the national interests of different EU member states in a balanced way. These NUSHARE stakeholders are expected to provide information about existing ETI programmes related to NUSHARE objectives as well as information about best practices in both

⁵ According to the definition given by the European Technical Safety Organisation Network (ETSON) the term *Technical Safety Organisation (TSO)* is used in this document for professional science based organisations realizing the technical evaluation of safety files in support of their national authorities. In the past those organisations have also been called *Technical Support Organisations*.

<http://www.etsn.eu/About/Pages/default.aspx>

⁶ In this Description of Work the term *learning objective* characterises a broad output of a learning process, while the term *learning outcome* is used to characterize a more specific and measurable result according to the concept “units of learning outcomes” as defined within the ECVET approach developed to ease assessment, validation, examination, and mutual recognition of ETI achievements (see “Guidelines for describing units of learning outcomes”) http://www.ecvet-info.de/media/Guidelines_for_describing_units_of_learning_outcomes.pdf.

private and public organizations. A “Stakeholders’ Seminar” will be organised to inform a wider community of experts about NUSHARE objectives and NUSHARE programmes under development and to elicit:

- views on the needs of the target groups,
- expressions of interest in closer links to NUSHARE for the further definition and the implementation of these programmes,
- potential contributions to their further (EU wide) dissemination during the following years of the project.

This “Stakeholders’ seminar” will be organised in close collaboration with the European Technology Platforms (SNE-TP + NUGENIA, IGD-TP, NERIS, ALLIANCE, ENEF) and with the competent authoritative expert associations (MELODI, ENSREG, HERCA) as well as with FORATOM and ENS. The relevant website addresses are in Section 1.3. Advantage should also be taken of the safety culture experience provided by the “*EU Nuclear Safety Clearinghouse for Operational Experience Feedback*” (in short OEF), run by DG JRC IET Petten. The main objective of this OEF initiative is to improve the safety of nuclear power plants by effectively and efficiently implementing the operational experience feedback. This initiative is supported by DG ENER and organised via a network of EU regulators and Technical Support Organizations (<https://clearinghouse-oef.jrc.ec.europa.eu/>).

The aim of this Stakeholders’ Seminar is to prepare the first version of the “NUSHARE Catalogue” of ETI Programmes, to be presented at the follow up “Special Event”. The expected outcome of this Seminar is a first series of concrete contributions e.g. in the form of official declarations and/or commitments of organisations or individuals who decide to dedicate some of their own resources to conduct or participate in specific parts of the ETI programmes listed in the NUSHARE Catalogue. Moreover this Seminar will enable the Task Force to identify the first list of members of the “NUSHARE support team” (defined in Section 2.1). The minutes (including the various commitments) and the list of actions (including responsibilities and deadlines) agreed upon at this Seminar will be documented in Deliverable D1.5.

In this context it is worth recalling that the EU cooperates beyond its borders towards nuclear safety and security. Under the Instrument for Nuclear Safety Cooperation (INSC), the EU has established cooperation with some 15 countries worldwide. The aim is to promote a high level of nuclear safety and radiation protection and the application of efficient and effective safeguards of nuclear material. In this framework, several projects are developed with the IAEA. DG DEVCO (Development and Cooperation - EuropeAid) is working on nuclear regulatory training, in particular, with EU neighbours and Russia. DG DEVCO and other EC services concerned with nuclear safety culture have expressed their interest in NUSHARE and will be invited to the Stakeholders’ Seminar.

References:

- European External Action Service (follow-up of TACIS programme)
http://eeas.europa.eu/nuclear_safety/index_en.htm
- DG DEVCO / Development and Cooperation (Europeaid)

http://ec.europa.eu/europeaid/where/neighbourhood/overview/index_en.htm

“NUSHARE ETI Catalogue” and Action Programme

The main product of the first year of the project will be a “NUSHARE Catalogue” of ETI Programmes to be published as a living document posted on the ENEN Website. It will describe the key features of existing and new ETI programmes deemed suitable to effectively support excellence in safety culture in nuclear activities at a European level. These key features will include information on “best practices” (with reference to world-wide standards), refined definitions of target groups and relevant sub-groups, learning outcomes and methodologies for the relevant sub-groups, topics and structures of proposed ETI programmes. An Action Programme will also be produced, containing concepts and tentative planning for the implementation of the ETI actions and preliminary figures of required and available human and financial resources.

Here is a tentative list of descriptors for the ETI actions to be collected in the various Member States and proposed in this first version of the “NUSHARE Catalogue”:

1. Title
2. General objectives and broad learning objectives
3. Target group (general profile, specific constraints or concerns)
4. Pre-requisites for attendance
5. Learning outcomes (formulated as active verbs)
6. Contents
7. Duration of session
8. Training approach (methodology, tools, materials, ...)
9. Evaluation scenario (e.g. Interactive Multiple-Choice Questions,...).

The catalogue will also provide information about the expected or agreed involvement of further NUSHARE stakeholders. This information will be based on the result of the Stakeholders’ Seminar and possible further agreements such as common declarations and/or commitments with respect to the conduct of or participation in specific parts of the ETI programmes listed in the NUSHARE Catalogue, to be implemented during the second phase of the NUSHARE project.

“Special Event” planned during the Second phase

To further highlight the importance of the NUSHARE objectives and solutions, a Special Event shall be organized with the aim of informing the public and the media about the NUSHARE programmes and the accompanying implementation. During this event the official version of the “NUSHARE Catalogue” of ETI Programmes will be presented. The event shall be organized with the participation of high-level representatives at both national and EU levels. Its preparation will include a campaign to raise the awareness of media with respect to the subject. See graphical interactions on section 1.4.2.

The expected outcome of this Special Event is the consolidation of the above first version of the “NUSHARE Catalogue” of ETI Programmes through the addition of existing (or easy to create) ETI

modules. Another series of concrete contributions is expected e.g. again in the form of official declarations and/or commitments of participants who decide to join the already existing “NUSHARE support team”. The minutes and list of actions of this Special Event will be documented in Deliverable D1.9.

At the end of the “first phase”, a “Framework Document” will be produced (D1.4) to summarize the lessons learnt and the list of follow-up actions agreed upon. Management of the Project, high-level discussions and the conclusions will be documented in deliverable D1.10 and is associated with milestone M1.7.

Second phase –execution of the proposed action program

In this second phase, the resulting action program shall then be carried out along the broad guidelines presented in the “NUSHARE ETI Catalogue” and action programme discussed above. During this time period, it is the responsibility of the stakeholders, bound by their commitment given in connection with setting up the “NUSHARE ETI Catalogue”, to offer, organize, implement and evaluate the various actions as agreed in the action program. For this purpose, the stakeholders will use various human and financial resources, such as self- funding (private or public training programs), external financial support, EU regional funds ("Cohesion Policy"), etc, wherever applicable. The above mentioned success criteria (Section 1.1) will be closely monitored during this second phase with emphasis on the question whether and how effectively the ETI actions contribute to sharing and growing the nuclear safety culture competences in all nuclear safety stakeholders across the EU. Deliverable D2.2 will document the results of this self-assessment as a basis for discussion with the relevant bodies concerned with the NUSHARE objective to share and to grow nuclear safety culture at a European level.

The proposed ETI programmes (TG1, TG2, TG3) will integrate or adapt existing actions, and create new ones whenever needed, with the aim of treating primarily scientific-technological issues but also socio-economic issues related to safety and security cultures. This holistic approach is aligned with the conclusion of the above mentioned "2012 Interdisciplinary Study" (“Benefits and limitations of nuclear fission for a low-carbon economy - Defining priorities for Euratom fission research and training”), presented at the 2013 Symposium "Nuclear Fission Research for a low carbon economy" (EC and EESC, 26–27 February, Brussels).

These programmes will be arranged in Modules that will have durations adapted to the specific needs of the respective target groups and sub-groups. These durations may range from half-day information actions for politicians or journalists up to training sessions of several weeks for young professionals. ETI providers (e.g. trainers or academia) and users (e.g. trainees or learners) may come from nuclear countries as well as countries embarking on nuclear power (within and outside the EU).

As far as applicable (e.g. for training in the usual sense), the proposed actions will meet the standard requirements of today's trainers and learners regarding, in particular, lifelong learning and cross-border mobility. As a reminder, this is one of the objectives of the Education, Youth and Culture policy of the EU and, in particular, of the European Credit System for Vocational Education and Training (ECVET) – see Council Conclusions on a strategic framework for European cooperation in education and training ("ET 2020"), Brussels, 12 May 2009. ECVET's objective is to promote mutual trust, transparency and mutual recognition of units of learning outcomes, expressed in terms of the ability to apply *knowledge*,

*skills, and attitudes/competences*⁷ acquired through VET, across the Member States and associated countries. In the NUSHARE project, whenever appropriate, a qualification system will be developed with flexible procedures for validation, transfer and recognition of units of learning outcomes. For this purpose a close collaboration will be established with national/regional competent authorities and with the "ECVET support teams" set up in all Member States (<http://www.ecvet-team.eu/>).

As another outcome of this Euratom ETI action, expert recommendations might be delivered regarding scientific priorities and funding mechanisms for future (national and international) research and innovation programmes in nuclear fission and radiation protection (Euratom Horizon 2020).

Part of the NUSHARE ETI programmes might also be of interest for society as a whole. This applies, for instance, to programmes addressing safety culture issues in a broader context, socio-economic issues related to safety culture, and risk management policies. This interest will be explored by a dialogue with stakeholders outside the nuclear community in the strict sense, such as ministries, parliamentary or diplomatic people, union representatives, journalists, lawyers, representatives of other business activities.

As a consequence, the ETI methodologies to be used in this project will contain a variety of learning paths (formal, non-formal, informal) and methods specifically tailored to the needs of relevant target groups and subgroups. It may include real or virtual classroom training, seminars, workshops and discussion sessions, training on demand, face-to-face or distance learning (e.g. the emerging "massive open online courses", also known as the MOOCs) , trainee coaching, information exchange with and education by peers (e.g. CEO to CEO exchanges), special events involving different target groups and/or subgroups, incorporation into programmes of other institutions (e.g. schools of journalism), internships, intelligent games and simulation actions, internet blogs or discussions via social networks.

Site visits providing practical examples related to safety culture issues and implementation may also contribute significantly to the success of the NUSHARE ETI programmes. In particular, the site visits of nuclear training, engineering, construction (new build and modernization projects including research reactors), operation, maintenance and decommissioning sites will offer a variety of opportunities to discover practical examples of how nuclear safety culture is implemented by different nuclear operators and at different phases in the life cycle of nuclear facilities. Additionally, medical installations applying ionizing radiation (e.g. imaging techniques and radio-therapy in oncology) shall also be addressed, as well as waste management sites for treatment and storage, reprocessing facilities, and geological disposal sites. These visits will ideally complement the classroom training, enabling the trainees also, in some cases, to work with simulators, virtual or augmented reality tools or other mock-up devices in a hands-on training environment. To ensure the effectiveness of this

⁷ In accordance with relevant IAEA terminology, documented, for instance, in the IAEA Safety Standard RS-G-1.4, this Description of Work for NUSHARE uses the KSA terminology defining *competence* as set of *knowledge, skills, and attitudes* and not the typology of knowledge, skills and competences (KSC) frequently used in ECVET related documents. This is consistent with the high relevance of attitudes for safety culture issues.

Source: "Building competence in radiation protection and the safe use of radiation sources" (jointly sponsored by IAEA, ILO, PAHO, WHO), IAEA 2001 (p 4) - <http://www-ns.iaea.org/standards/documents/pubdoc-list.asp>

approach, specific care will be taken to guarantee a broad coverage of important nuclear practitioners in this field.

Synergies will also be established with relevant (inter)national and Euratom E&T projects, such as the FP7 projects TRASNUSAFE, CORONA, EUTEMPE-RX, GENTLE or ENETRAP-III.

- TRASNUSAFE - *Nuclear Safety Culture*: addressing mainly the health physics sector (e.g., ALARA principle in industry and medical field) (Nov. 2010 - October 2014)
- CORONA - *Regional Center of Competence for VVER Technology and Nuclear Applications*: focus on VVER personnel training (December 2011 – November 2014)
- EUTEMPE-RX - *EUropean Training and Education for Medical Physics Experts in Radiology*: focus on Euratom Directive COM(2011) 593 (August 2013 – July 2016)
- GENTLE - *Graduate and Executive Nuclear Training and Lifelong Education*: focus on synergy between industry – academia (January 2013 – December 2016)
- ENETRAP-III - *European Network on E&T in Radiological Protection*: addressing mainly the nuclear regulatory authorities and TSOs (March 2014 – February 2018).

To fully support the dissemination of competences, a staggered EU approach shall be envisaged. The first step will consist of training and information sessions with an international orientation and preferably held in English. These international sessions will address representative stakeholders across the various EU Member States. They will also serve as the means of training of trainers and the production of training and information material of common interest (both software and media, including also educational articles in national newspapers of recognised quality). The second step would then be the EU-wide application of the achievements of the first step with special regard to identified best practices. Depending on the nature of a NUSHARE ETI programme, this step may be a programme at a national or regional level within Member States and non-EU countries (considering specific national/regional needs and normally given in the respective national language) or an optimised version of the international programme with participation of additional ETI providers and additional countries.

To facilitate EU-wide implementation of the NUSHARE training and information actions a “NUSHARE support team” will be established as a group of “NUSHARE stakeholders” (defined in Section 2.1). Stakeholders in EU Member States applying or planning to apply nuclear energy will be asked to get involved in the preparation and execution of NUSHARE programmes. These stakeholders, for instance, commit themselves to initiating, supporting and monitoring the implementation of actions from the “NUSHARE ETI Catalogue” in their respective Member States, and provide feedback to the NUSHARE project with respect to programme’s impact on safety culture and the possibilities of their future optimization. The “NUSHARE support team” is a dynamic concept: it is composed of the members originating from the above “Stakeholders’ Seminar” and “Special Event” plus new entrants who take similar commitments during the Years 2, 3 and 4. It will be documented in the Deliverables 1.6, 2.1, 3.1, and 4.1.

A result oriented strategy is essential for the success of the ETI programmes agreed in the NUSHARE Catalogue and for assessing their impact on sharing and growing nuclear safety culture competence.

Consequently, for the success of this project it is paramount to specify the learning outcomes of the various ETI actions and to evaluate their results against suitable criteria, wherever reasonable.

As far as applicable, the European Credit system for Vocational Education and Training (ECVET) will be used in this context⁸. This approach, that is already applied in continuous professional development (CPD) actions of other industrial sectors in the EU (e.g. automotive and aeronautics), supports an assessment of the individual's learning outcomes that can lead to mutual recognition of the competences acquired. In this context, "Personal Transcripts of records" could be developed (as it is done in other CPD actions based on ECVET), containing information on assessed learning outcomes the learner has achieved by attending education and training sessions: the transcript is a record of his/her learning achievements. Associated "training passports" (e.g. inspired from the "Europass" concept) might also be developed, whenever requested, with the aim of describing the qualifications achieved by the learners who are to undergo mobility. It is clear, however, that the above mentioned "personal transcripts" and "training passports" do not constitute a license or an official authorisation (in the legal regulatory sense of the word) to construct, operate or supervise.

The three following sections contain preliminary information about the planned ETI programmes and actions for the three target groups TG1, TG2 and TG3. This information is structured as follows:

- Details about the members of the respective Target Group (TG)
- Details characterizing the ETI programmes for the TG
 - Pre-requisites and guidelines for TG
 - Preliminary list of issues to be addressed for TG
 - Provisional list of learning objectives for TG
 - Provisional contents of proposed ETI programmes for TG
- Customized methodology of proposed ETI programmes for the TG.

⁸ It is expected that the ECVET approach will be applicable to many of the NUSHARE education and training actions but generally not to information actions.

1.1.1 ETI Programme for TG1 “Policy Decision Makers and Opinion Leaders”

1 - Details of the members of Target Group 1

For policy decision makers, the number of existing ETI programmes related to NUSHARE objectives is still very limited in most EU Member States. In the post-Fukushima era those programmes are, however, of increasing importance to prepare decision makers to properly address relevant issues associated with the management of nuclear energy policy and with the related public engagement processes. ETI programmes at EU level can thus be highly relevant for the successful formulation and implementation of nuclear policies as well as for the public understanding of facts related to nuclear safety culture.

A special concern is to approach the decision makers in charge of the design and implementation of national energy mix policies along the lines of the EU energy policy (three pillars: sustainability, security of supply, competitiveness) as well as those people in the EU administration responsible for the policy itself. Wherever reasonable, close contacts will be established with the "European Technological Platforms" and/or competent authoritative expert associations concerned. TG1 is related to the level of “governance” corresponding to governmental as well as parliamentary bodies dealing with energy matters (e.g. ministries of energy, industry, environment, ...), as well as authorities involved in energy policies at national, regional or international level, etc.

Regarding the important role of media for the successful implementation of energy policies in many EU Member States, journalists involved in reporting energy policy and related environmental, safety and risk issues are another relevant sub-group of TG1.

The medical doctor’s community is considered to be a further sub-group of TG1 due to the significance of medical aspects in emergency planning and crisis management. The needs related to this subgroup are reflected, for instance, in relevant reports of the specific association “Heads of European Radiological protection Competent Authorities Association (HERCA)” ref ⁹. Another specific association to be involved in this action is the “European Platform on Preparedness for Nuclear and Radiological Emergency Response and Recovery” (NERIS).

2 - Details characterizing the ETI programmes for Target Group 1

Pre-requisites and Guidelines for TG1

It is assumed that many decision makers have no advanced scientific educational level and limited background in nuclear technology and in knowledge about safety culture. ETI programmes would then be conceived accordingly, for example, as individual information actions and workshops rather than training courses. The ETI programmes will be based on the needs of this target sub-group in understanding basic features of nuclear energy and nuclear safety, the roles of cultural, organisational and behavioural factors with respect to nuclear safety, and the significance of the individual (e.g. self-critical attitudes), management and organisational prerequisites (e.g. availability of financial resources) for achieving excellence in safety culture. The considerations should not, per se, be limited to safety culture in nuclear power plants but also address fuel cycle, waste management and radiation protection

⁹ HERCA - “Stakeholder Involvement in Medical Practices / Report of the Working Group (12 December 2008)”
<http://www.herca.org/documents/Stakeholder%20Involvement%20in%20Medical%20Practices%2020081212.pdf>

issues because safety culture is a need and a challenge for all kinds of nuclear activities (see also revised Nuclear Safety Directive).

Parallels may be drawn with the approaches in other industries (nuclear, chemical, aeronautics, mining, health, ... see also EC "Seveso" Directives, European Agency for Safety and Health at Work /EU-OSHA/, etc) where the basic safety approaches are often similar but the safety relevant cultural factors may be quite different.

Preliminary list of issues to be addressed for TGI

The training course contents will be expressed in terms of topics and learning objectives. The focus will be on the issues that policy makers may be faced with when evaluating actions associated with nuclear safety and related risks. This is also relevant for people influential to decision making such as opinion leaders. For example:

- Radiation: Would any dose of radiation be harmful to population? What is the impact of low dose radiation (linear no-threshold model versus hormesis)?
- Casualties: How many casualties have been caused by the Chernobyl accident? And how many should be expected after the Fukushima accident?
- Europe: Is a major nuclear accident possible in Europe within the next 30 years? If yes, what would be the short and long term consequences for man and environment?
- "Low cost nuclear": Do reactors of Generation III (equipped with enhanced safety features) remain competitive enough?
- MOX fuel and reprocessing: Is plutonium an asset or a liability? What are the consequences in terms of waste management policies and/or nuclear new build strategies?
- Back-end of the Fuel Cycle: What are the realistic safety and public health issues associated to long term nuclear waste management?
- Operation: Is the mind-set of a nuclear industry manager different from a car factory manager? What is the role of Backfitting and Design Change Management?
- Safety management : what are the respective roles of regulators and policy makers on one side and of the operating organisation on the other side? What is the difference between "classical" safety management and "resilience engineering" ?
- Safety culture: what is the impact of designer, operator, regulator, policy makers etc. on safe operation ? (in both the nuclear industry and the radio-medical world)
- Public engagement (including public understanding): Do nuclear activities and policies lack transparency? How to improve the nuclear governance structure?
- Legal frameworks for safety (protection of people and the environment against radiation risks) and for security (proliferation resistance and physical protection)
- Socio-economic questions such as: What risks in life exist, and how they are perceived by people and the media (multicultural context)? What is an acceptable or tolerable level of (nuclear) risk for the public as a whole?

- Communication: How to deal with and how to communicate about uncertainties and risk management? How to involve the stakeholders in a holistic debate covering all power generation technologies? What is the role of the International Nuclear and Radiological Event Scale (INES) in that context?

Provisional list of learning objectives for TG 1

Essential competences to be acquired or strengthened after successful completion of the proposed ETI programmes can be outlined by learning objectives. For instance the learner should:

- Be aware of nuclear safety concepts, principles and factors from a systemic perspective;
- Understand the concept of safety culture and its relevance for risk industries, drawing the lessons from Fukushima;
- Be able to explain the specific nature of nuclear risk and how it is accounted for in the life cycle of nuclear installations – and compare amongst EU Member States;
- Be able to judge the role of the different actors, including governments, media and civil society, and the required level of involvement and interaction;
- Have the right attitude to act correctly in real life situations with relevance to nuclear safety;
- Be able to discuss the relationship between decision-making and public debate;
- Evaluate the possible outcome of research and innovation actions (national and Euratom) on the improvement of safety culture, e.g. in connection with system resilience and capacity for recovery;
- Be able to recognise misleading information regarding risk activities in the public debate – and compare nuclear and non-nuclear sectors.

A list of more specific learning outcomes will be developed, such as:

- Be aware of the basic nuclear safety objectives, principles and their implementation (e.g. defence in depth, consideration of events including internal and external hazards);
- Describe the characteristic design features of Light Water Reactors (Pressurized Water Reactors, Boiling Water Reactors) and main differences of other concepts of reactors operated in and around the European Union (AGR, CANDU, RBMK);
- Describe the environmental effects of radioactivity and the relevant protection measures;
- Describe the legal framework for the use of nuclear energy (in particular, Euratom legislation);
- Explain the management of nuclear sites in critical situations and compare it with the approaches in other industries;
- Describe the basic financial, organisational, and political prerequisites for achieving excellence in safety culture;
- Evaluate basic alternatives in emergency situations and give broad recommendations regarding the implementation of actions;
- Communicate efficiently on critical situations and decisions.

Provisional contents of proposed ETI programmes for TG 1

Suggested items for the proposed ETI programmes are:

- Insights into the physics of nuclear reactors and fuel cycle facilities: the fission process and the effects of radioactivity (decay heat, release of fission products, generation of radwastes).
- Nuclear risk, defence-in-depth, safety barriers and safety functions;
- Accident families, technical means of prevention, control and mitigation;
- Severe accidents: lessons learnt from major historical accidents;
- Experience feedback and its impact on the improvement of prevention and control of accidents, and the protection of humans and the environment from radiological hazards;
- Medical aspects: Evaluation of biological and ecological effects of radioactive materials and radiations, radiation protection, medical applications of ionizing radiations (imaging, therapy);
- Post-accident management: repair and recovery during and after accidents, medical assistance, agricultural countermeasures, long term protective actions, emergency management in extreme situations, remediation strategies.
- Safety culture implementation in the man-technology-organisation (MTO) system: organizational factors influencing nuclear safety, the impact of culture on the safety of nuclear installations, relations between safety culture, plant organisation and safety management, safety culture in different domains (preventive safety measures, emergency preparedness, crisis situations); Best practices related to safety culture;
- The roles of policy decision makers in strengthening safety culture in organisations related to the nuclear sector;
- Communication: basic approaches, techniques for transparent and comprehensible information transmission to responsible organizations and to the public at large.

3 - Customized methodology of proposed ETI programmes for Target Group 1

The objective is to develop engagement of policy decision makers and opinion leaders through a better understanding of nuclear issues with a strong focus on nuclear safety culture aspects. The coverage of scientific aspects will be restricted to basic concepts, illustrated by visual examples (schematics, pictures, movies, ...). For basic parameters meaningful orders of magnitude will be provided.

Particular attention will be given to interactive resources including case studies, role plays, hands-on experiences and visits to relevant technical facilities (e.g. to nuclear reactors, training centres, simulators, maintenance centres, decommissioning sites) providing practical examples how nuclear safety culture is implemented by different nuclear sectors and at different phases in the life cycle of nuclear facilities.

1.1.2 ETI Programme for TG2 “Nuclear Regulatory Authorities (NRA) and Technical Safety Organisations (TSO)”

1 - Details of the members of Target Group 2

Nuclear education and training (as well as accompanying legal provisions) are mentioned explicitly in a number of recent Euratom Directives (with binding value), such as:

(1) "*Nuclear Safety Directive*" (EU Council, Brussels, 25 June 2009)¹⁰ and the proposed 2013 revision

This EU Directive constituted a major step toward achieving a common, legally binding framework and a strong nuclear safety culture in the EU. When the Fukushima accident took place, the EU decided to revise this Directive earlier than initially planned to incorporate the lessons learned from the accident - (COM(2013) 343 - http://ec.europa.eu/energy/nuclear/safety/safety_en.htm).

Article 7 is devoted to “Expertise and skills in nuclear safety” and states the following:

“ Member States shall ensure that the national framework requires all parties to make arrangements for education, training and exercise for their staff having responsibilities relating to the nuclear safety of nuclear installations and to on-site emergency preparedness and response arrangements, in order to build up, maintain and to further develop expertise and skills in nuclear safety. “

(2) “*Waste Directive*” - (EU Council, Brussels, 19 July 2011) ¹¹.

Excerpt: WHEREAS (38) "Maintenance and further development of competences and skills in the management of spent fuel and radioactive waste, as an essential element to ensure high levels of safety, should be based on learning through operational experience."

Article 8 is devoted to "Expertise and skills": “Member States shall ensure that the national framework require all parties to make arrangements for education and training for their staff, as well as research and development activities to cover the needs of the national programme for spent fuel and radioactive waste management in order to obtain, maintain and to further develop necessary expertise and skills."

(3) "BSS" ¹² - Proposal for a COUNCIL DIRECTIVE laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation (Brussels, 30.05.2012) (final approval expected by the end of 2013)

A number of "Requirements for radiation Protection Education, Training and Information" (Article 15) are mentioned in this Directive. Definitions and tasks are given, in particular, to the "*Radiation protection expert*" (Article 84), the "*Medical physics expert*" (Article 85) and the "*Radiation protection officer*" (Article 86).

Moreover, as stated in INSAG-15 (IAEA 2002) “Although safety culture cannot be directly regulated, it is important that members of regulatory bodies understand how their actions affect the development of attempts to strengthen safety culture and are sympathetic to the need to improve the less formal

¹⁰ <http://register.consilium.europa.eu/pdf/en/09/st10/st10667.en09.pdf>

¹¹ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:199:0048:0056:EN:PDF>

¹² http://ec.europa.eu/energy/nuclear/radiation_protection/doc/2012_com_242.pdf

human related aspects of safety”. Other IAEA documents are also important, such as:

“Regulatory Oversight of Safety Culture in Nuclear Installations” (TECDOC 1707) (2013).

Safety is based mainly on rules and regulations and at the compliance stage can be seen as a technical issue. It is at this stage that NRAs and TSOs influence organisations’ safety culture through their technical expertise in questioning safety. The construction of this particular expertise is more than a matter of education as it involves transfer of practical knowledge and culture (*the mind-set of nuclear safety*).

The target audience will be professionals (preferably at higher education level) working in nuclear regulatory authorities and technical support organizations. TG2 will also address those in charge of professional development and training in nuclear safety organisations (“train the trainers”). Ultimately, the programme will serve professionals involved in the licensing of all types of activities and facilities from the nuclear cycle and the use of radioactive material in medicine and industry.

2 - Details characterising the ETI programmes for Target Group 2

Prerequisites and guidelines for TG 2

The pedagogic approach will take account of the IAEA Safety Requirements and Guidance, EU legislation, in particular above-mentioned Safety Directive, Waste Directive, BSS Directive, WENRA reports and other relevant documents (e.g. ICRP recommendations) and of relevant IAEA documents, such as on Systematic Assessment of Regulatory Competence Needs (SARCoN) and the Regulatory Oversight of Nuclear Safety Culture to define required knowledge, skills and attitudes necessary to perform technical and regulatory work in NRAs and TSOs. Close contacts will be established with regulators’ associations ENSREG (European Nuclear Safety Regulators Group) and HERCA (Heads of European Radiological protection Competent Authorities) as well as with NERIS (European Platform on Preparedness for Nuclear and Radiological Emergency Response and Recovery).

Preliminary list of issues to be addressed for TG 2

Basic Training Programmes will be developed specifying learning objectives that support the systematic and effective development of young professionals and qualified staff working or planning to make a career at NRAs and TSOs. The training programme aims at building-up personnel able to carry out radiation safety, nuclear safety and nuclear security regulatory functions, with a focus on the oversight of nuclear safety culture at nuclear and other associated facilities to satisfy the State’s needs and to meet national requirements.

Provisional list of learning objectives for TG 2

After the successful completion of the *Basic Training Programme*, the learner will be able to:

1. Explain the fundamental principles that form the system for the protection of humans and their environment from the damaging effects of ionizing radiation;
2. Discuss the legal basis and regulatory process that empower the NRA to govern its operation within their national framework;
3. Describe the fundamentals of safety culture – and compare nuclear and non-nuclear sectors;
4. Explain the basics of regulatory oversight of licensees including the licensee's approaches and achievements related to safety culture and to compare the different oversight approaches;
5. Identify the different steps of the safety culture oversight process and differentiate between nuclear safety and nuclear security culture;
6. Evaluate the possible outcome of research and innovation actions (national and Euratom) on the improvement of safety culture, e.g. regarding basic, applied and advanced technical disciplines related to the regulatory control of facilities and activities using ionizing radiation;
7. Describe and discuss regulatory practices such as assessment and inspections technologies, investigation and auditing – and compare amongst EU Member States;
8. Demonstrate soft skills necessary to carry out regulatory functions such as, communication, analytical thinking, problem solving or decision making;
9. Describe relevant international cooperation activities, in particular related to sharing best practices and sustainable nuclear safety culture;

Provisional contents of proposed ETI programme for TG 2

The *Basic Training Programme* will be structured in independent modules with the aim of improving knowledge, skills and attitudes in the following areas: legal regulatory framework, technical concepts related to regulatory control of nuclear material and activities, regulatory oversight of nuclear safety culture, personal and interpersonal effectiveness, international cooperation;

There are 14 topics relevant to NRA staff training: Legal and regulatory framework, regulatory role & function; Licensing management, basic safety concepts and decision making; Design safety and safety evaluation; Review and Inspection of Systems, Structures and Components; NPP site safety analysis and regulatory requirements for licensing; Criticality control; Regulatory Inspections during siting and construction phase; Regulatory oversight during NPP operation; Radiation Protection and emergency preparedness; Transport of nuclear and radioactive materials; Public Information; Organizational culture and its impact on safety at nuclear installations; The role of NRA in fostering the continuous improvement of safety culture in nuclear installations; Impact of NRA on the safety culture of nuclear installations.

There are 20 topics relevant to TSO staff training: Nuclear Fuel Cycle Safety; Nuclear Reactor Safety; Decommissioning; Waste Safety; Nuclear Security; Safety Assessment; Criticality Safety and Thermal-hydraulics; Ageing and Mechanical Analysis; Radiation Protection and Confinement Systems; Human and Organizational Factors; I&C and Electric Systems; Site Evaluation; Fire Protection; Operating

Experience Evaluation; Emergency and Environmental Impact Assessment; Organizational culture and its impact on safety at nuclear installations; Impact of TSO on the safety culture of nuclear installations; Recognize the key organizational factors influencing nuclear safety; Recognize their own impact on nuclear installations in the achievement of a strong and positive safety culture; Personally foster a strong and positive nuclear safety culture in nuclear installations.

3 - Customized methodology for the proposed ETI programme for Target Group 2

ENSTTI, created by European TSOs in 2010 to deliver high quality training and tutoring in nuclear safety, will coordinate the actions, provide expertise in training engineering, set up pilot training and tutoring modules and implement them. An ad hoc training methodology will be set up by ENSTTI together with other potential partners.

ENSTTI, being an initiative of the European TSOs, grouped under the ETSON association¹³, ETSON will also be a potential partner in assisting in the needs analyses and definition as well as in delineating training and tutoring modules that adequately respond to these needs.

EU NRAs are also considered as potential partners to provide training requirements, share parts of their internal training programme of relevance for harmonization, comment on ENSTTI and ETSON training and tutoring modules proposal.

Synergies will be sought with complementary actions supported by the EU such as the DG-DEVCO project MC3.01/10 and MC3.01/11 Training and Tutoring for experts of the NRAs and their TSOs.

The design of the Basic Training Programme will focus on the use of interactive teaching methods involving participants as much as possible in the learning process. It will include information sessions, instructor-led class room sessions, self-study, distance learning supported by mentors, individual and group assignments, site visits and tutoring sessions. The Training Programme will be designed to allow adequate time for participants to discuss and interact with each other and to foster networking. The atmosphere will be informal and collegial in which participants know they are in a supportive learning environment. Special attention will be devoted to the evaluation methodology, and, in particular, to the assessment of the individual's learning outcomes that can lead to mutual recognition of the competences acquired.

¹³ Present members of ETSON are TSOs of 9 EU Member States (Belgium, Bulgaria, Czech Republic, Finland, Germany, France, Lithuania, Slovakia, Slovenia) and Switzerland

1.1.3 ETI Programme for TG3 “Electric utilities and systems suppliers“

1 - Details of the members of Target Group 3

TG3 corresponds to the wider “nuclear industry” (i.e. electric utilities and systems suppliers), covering a range of diverse supplies and services. One not only has to consider companies that are operating nuclear facilities, but also the suppliers of goods and services. Many different enterprises will have to be taken into account, beginning with large, multinational companies able to operate and/or to build nuclear facilities or to modernise them on a large scale, and ending with small or medium enterprises providing supplies or services on a smaller scale (e.g. the nuclear industry subcontractors). In the latter case, these supplies or services are also provided to other market segments as well as nuclear facilities. These enterprises may be active in designing, constructing and commissioning nuclear facilities or modernising existing ones, as well as in providing non-safety related equipment or connected services for these facilities.

As for sharing and developing nuclear safety culture, the industry target group for training and information actions within this project should be restricted to decision makers (i.e. upper and middle line management), safety and quality managers, and research and development managers in industry. As a consequence, it is assumed that trainers and learners have an academic (or equivalent) educational level and a good background in nuclear technology.

2 - ETI programme for electric utilities and systems suppliers

Pre-requisites and guidelines

As regards the licensees and the operators of nuclear facilities, the past decades have already seen a variety of initiatives to implement and improve safety culture in these organizations. These initiatives have been supported by different international institutions, for example, the World Association of Nuclear Operators (WANO), the International Atomic Energy Agency (IAEA, Vienna) and OECD/NEA (Paris). They included training and information activities for personnel of these organisations on nearly all organizational levels. Comparable initiatives have been launched for large, often multinational companies, acting as primary suppliers for nuclear operators.

However, in the light of recent events it appears reasonable to further support the development and improvement of safety culture, as this is the main goal of this Project. That is why addressing top managers of nuclear operators, and suppliers, including those acting at the front end and back end of the supply chain, the focus should be laid on societal, legal, organizational and safety culture issues, personal values and attitudes.

The programme should address not only nuclear reactors but also fuel cycle and waste management because safety concerns pertain to all stages of the nuclear fuel cycle. The various multinational vendor companies (e.g. AREVA, Westinghouse-Toshiba, GE-Hitachi) and systems suppliers as well as the large electro-nuclear utilities and the "owners' groups" (in particular, PWROG and BWROG) should be contacted and invited to share their practical experience and high-level expertise by contributing actively to this EU-wide training action.

Of particular interest in this context is the ENSREG “Final report on the Peer Review of EU Stress Tests” (26 April 2012 - <http://www.ensreg.eu/node/407>). Training and research are mentioned many

times (not surprisingly, with emphasis on severe accident management /SAM/). The following excerpts are particularly appealing:

- "Such measures include provisions of additional mobile equipment to prevent or mitigate severe accidents, installation of hardened fixed equipment, and the improvement of severe accident management, together with appropriate staff training measures"
- "Where the reactor vendor has not yet developed SAMGs, the utilities have developed their own strategies based on international research and knowledge transfer (e.g. through owners' groups)."
- "With regard to the organisation of SAM, many countries have decided that the WENRA SAM-related "reference levels" (RLs) should be reflected in the national regulations. The harmonisation of SAMGs and related training across units, sites, utilities and even across borders is envisaged."

Of additional significance is the official report of the Fukushima Nuclear Accident Independent Investigation Commission /NAIIC/ (2012). The message from the chairman of the Commission, Mr. Kiyoshi Kurokawa summaries:

"What must be admitted- very painfully- is that this was a disaster "Made in Japan". Its fundamental causes are to be found in the ingrained conventions of Japanese culture: our reflexive obedience; our reluctance to question authority; our devotion to 'sticking with the program'; our groupism; and our insularity"

Also of interest are the conclusions of the "Report of the SNETP Fukushima Task Group" (January 2013), especially "Section 3. Identification of relevant research areas". Their following sentence is directly applicable to training actions in TG3:

"A special attention shall be made on how the research outcomes will be implemented and so transferred into normal industrial practice."

Preliminary list of issues to be addressed for TG 3

The training course contents will be expressed in terms of topics and learning objectives. The focus will be laid on the concerns that Industry may have regarding nuclear safety culture, for example:

- Safety management: How to organize and manage a company with the full implementation of safety management as part of the integrated management system?
- Systemic view of safety: How to integrate and manage the interconnections within the man-technology-organisation (MTO) area?
- Daily plant management: How to continuously improve nuclear safety culture within the daily business of the industry?
- Engineering resilience¹⁴: How to address safety culture and systemic safety issues to create resilience for unexpected events?

¹⁴ Resilience is the intrinsic ability of an organization to adjust its functioning prior to, during, or following changes and disturbances so it can sustain required operations under both expected and unexpected conditions (E. Hollnagel, Resilience Engineering, ASHGATE, 2006)

Provisional list of learning objectives for TG 3

After the successful completion of the Training Programme the participants will be able to:

1. Summarise the concept of nuclear safety from a systemic perspective
2. Describe how the culture of a nuclear organisation is created, learnt, developed and can be changed
3. Comprehend the impact of top manager's individual behaviour and beliefs on safety culture
4. Understand the relationship between safety culture and leadership
5. Achieve leadership competencies to work with safety culture and systemic safety.
6. Encourage and help others to grow and develop, and promote a healthy safety culture
7. Evaluate the possible outcome of research and innovation actions (national and Euratom) on the improvement of safety culture, e.g. in connection with resilience for unexpected events.

A list of specific learning outcomes will be developed, such as training participants to:

- Describe legal frameworks, definition and implementation of nuclear safety, and the management of nuclear sites in critical situations,
- “train the trainers” and inform a broader public about the topics dealt with in the training and information actions
- Assess different practices and strategies for organisation, human resources and safety culture development, emergency management and communication, and compare amongst EU Member States,
- Evaluate alternatives, and decide on what to implement on the basis of well documented case studies (taken from industry or from EC services such as the “*EU Nuclear Safety Clearinghouse for Operational Experience Feedback*”),
- Communicate efficiently on critical situations and decisions made,
- Recognize the key organizational factors influencing nuclear safety,
- Recognize their own impact on nuclear installations in the achievement of a strong and positive safety culture,
- Describe how culture is created in a nuclear organization, developed and changed,
- Show specific leadership competencies to improve the safety culture, and compare nuclear and non-nuclear sectors
- Personally foster a strong and positive nuclear safety culture in nuclear installations.
- Understand how resilience is generated to manage unexpected events.

Provisional contents of proposed ETI programmes for TG 3

Topics relevant to this TG for training programmes and informative actions are:

- best practices (regarding knowledge, skills and attitudes) and mutual recognition of job

qualifications across the EU to ensure the safe operation of nuclear plants, through technology, regulation and safety culture as well as institutional and organizational processes,

- the "stress tests" ("targeted reassessment of the safety margins of NPPs in the light of the events which occurred in Fukushima") and international safety reviews,
- human and organisational factors for implementing and maintaining a nuclear safety culture, and their relation to integrated management systems,
- safety related systems and estimation of related impact for industry,
- enhancement of site's self-sufficiency in the case of severe accidents,
- appropriate anticipation, repair and recovery strategies in case of severe accidents (including long-term restoration),
- interactions between regulatory authorities, experts, suppliers and nuclear operators; the role and expectations of the different groups (government, authorities, industry)
- organisational culture and its impact on safety at nuclear installations,
- the role of every individual at all levels in fostering the continuous improvement of safety culture in nuclear installations,
- individual and collective impact on the safety culture of nuclear installations,
- recognize the key organisational factors influencing nuclear safety,
- recognize their own impact on nuclear installations in the achievement of a strong and positive safety culture.

3 - Customised methodology for the proposed ETI programme

The main objective of training and information actions for industry (TG3) is to share and expand nuclear safety culture, with a strong focus on commitment to the implementation, development and continuous improvement of safety culture. The ETI activities will be considered as a Continuous Professional Development (CPD) Program. Technical issues should be dealt with to some degree on an introductory level, illustrated by visual examples (schematics, pictures, movies...). A large part of the training and information actions should be devoted to practical exercises involving experts in the field (case studies...), hands-on experiences (training reactors, simulators, etc.) and technical visits. The methodology applied will be mainly based on learning from experience in which the participants are put in (risky) situations and have the opportunity to acquire knowledge, skills and attitudes (competences) through real cases study, role-playing, simulations and sharing of personal experiences.

Of particular interest are the site visits to important nuclear training, engineering, construction, operation, maintenance and decommissioning sites, showing practical examples of how nuclear safety culture is implemented by different nuclear sectors and at different phases in the life cycle of nuclear facilities. Consequently, these technical visits, integrated with the above training and information actions, will be major components of the training programme.

1.1.4 General comments on above sections 1, 2 and 3

The above lists of training topics and learning outcomes for target groups TG1, TG2 and TG3 are preliminary and not exhaustive. They provide illustrative examples that can be used as inputs for deeper analyses to be conducted during the 1st phase of the project and for a discussion with further stakeholders, in particular for the discussions during the planned “Stakeholders’ seminar”. These analyses and discussions will take into account recent insights and lessons learnt that may serve as indicators for priorities.

Topics to be addressed by ETI programmes might also be taken from relevant reports such as the "Report of the Japanese Government to the IAEA Ministerial Conference on Nuclear Safety" (Vienna, June 2011), the 28 "Lessons Learned From the Accident Thus Far" and the risk and safety re-assessments (so-called 'stress tests') requested by the European Council (25 March 2011), or the INPO Document INPO 12-012 “Traits of a Healthy Nuclear Safety Culture” (April 2013). Also of interest is the recent OECD/NEA document “*The Fukushima Daiichi Nuclear Power Plant Accident: OECD/NEA Nuclear Safety Response and Lessons Learnt*”, September 2013, OECD /NEA report No. 7161.

Additionally, given the importance of developing and continuously improving safety culture as a prerequisite for safely running a nuclear business (from design to decommissioning and final storage) key aspects with respect to the impact of human and organisational factors on safety culture will be considered in the programmes for all three Target Groups.

This input will be collected during the course of phase 1 and documented in a living “Framework Document” (Deliverable D1.5), which will be used as guidance for discussions among the participants and stakeholders of the project about the priorities of the project, the structure and contents of the "NUSHARE ETI Catalogue", and the action plan for phase 2.

It is noteworthy that the successful organisation of stakeholder input - via the Stakeholder Seminar, for instance - is essential to contribute to the success of this Coordination Action. Thus the organisation of this input is a major objective of the project consortium for the project’s first year activity. It will be organised at various levels including a Task Force (defined in Section 2.1) with external members representing the perspectives of the main target groups, an advisory board representing the perspectives of end users, and the interaction with further (external) stakeholders sharing the NUSHARE objectives.

The planned Stakeholder Seminar (Section 1.1) will contribute to the collection and structuring of such external contributions to the project. It will be prepared with support from the NUSHARE Task Force, providing close collaboration between the project’s consortium and the NUSHARE stakeholders. Links will also be established, in particular, with representatives of DG RTD, DG ENER, DG JRC and DG EAC who must actively participate through their contacts, at an adequate level, with stakeholders’ representatives, to obtain commitments and engagement for the implementation of the ETI programmes.

Mutual recognition across the EU Member States and across different organizations is an objective for some training modules delivered within the NUSHARE ETI programmes. For this purpose, discussions will be held with appropriate national and EU bodies (such as ENSREG and HERCA for Target Group 2) involved in the qualification or the certification of training and its EU-wide harmonisation. The above-mentioned "Personal Transcripts" and “Training Passports” should be used as far as reasonable, to provide a record and to document the attended training activities and the acquired learning outcomes (knowledge, skills, attitudes / competences), as an important instrument to enable life-long learning and

cross-border mobility through the mutual recognition of the competences acquired.

1.2 Towards a EU-wide harmonised approach for ETI in nuclear safety culture

Following the IAEA definition, *competence* means *the ability to apply knowledge, skills and attitudes so as to perform a job in an effective and efficient manner and to an established standard (S.S.S. No. RS-G-1.4 / 2001)*. Obviously competences should be developed through education, experience and training. Qualification is a formal statement of achievement, resulting from an auditable assessment. After competence has been assessed, the qualification becomes a formal statement of competence and may be shown on a certificate, a diploma, a passport or any other type of evidence of an assessment with a positive result.

The development and testing of ETI programmes in a multinational network will take into account the different approaches and cultural attitudes towards education and training across the European Union. Teachers / trainers will be facing the opportunities and challenges to prepare the trainees from different cultural backgrounds and international organizations to work in an increasingly interdependent environment. The international experience will pay lifelong dividends to the trainees, as they become more sensitive to other cultures and policy issues in different countries. The training programmes will create a supportive environment where the participants will integrate the different competences as an integral part in their curriculum. Strategies to create a learning environment that encourages: social interaction, active engagement and self-motivation, will be part of the pedagogic framework of the training programmes. Methods and activities will be explored to facilitate access to information sources on an international scale, to solve problems in collaboration with trainees in other countries.

This approach and the coordination of the different training programmes across the EU will enable the trainees to improve their competences in nuclear safety culture, while acquiring an enhanced flexibility and a greater sensitivity to community diversity and cultural identity.

Contractor and subcontractor trainers will train local trainers in a series of pilot courses and information sessions in order to enable them to disseminate the teaching materials in their respective home countries or international organizations. Accordingly, contractor and subcontractor trainers will be facing a variety of situations and cultural environments and the trainees (the local trainers) will be exposed to a common course, information session or workshop. This approach will strengthen and support a coordinated approach in the training area. It is expected, for example, that this approach will achieve a greater homogeneity in nuclear safety culture competences and in support activities to NPPs, such as the delivery of supplies and services that are currently subject to different quality standards based on a graded approach, or activities dealing with plant safety systems whose standards are based on a different safety concepts and policies. Typical examples are assessment of risk, quality assurance, compliance with procedures, communications, teamwork, work in hazardous environments, concerns about nuclear safety, accident prevention and mitigation, crisis management and communication.

Accordingly, contractor and subcontractor trainers must be competent and effectively accommodate the different educational backgrounds and cultural environments of the trainees (the local trainers) in their courses, workshops and training sessions. Assurance is required that contractor and subcontractor trainers meet the qualification criteria to transfer the competences to the trainees. A commonly developed training programme incorporating the various concepts and approaches will then deliver local trainers with a broad field of competence and great flexibility.

In contrast to the past, where nuclear energy was based on national utility companies, national regulators

and licensing regimes, national energy policies and safety rules, the nuclear field is now involving transnational utilities, more coordinated safety authorities, international approval of NPP concepts and design, and multinational vendors. The effective functioning in this environment requires a broad approach in the training programme, whose modules and components will require acceptance and recognition by the international community. A harmonised approach for ETI in nuclear safety culture across the European Union and beyond will be the natural consequence of these developments.

1.3 Quality and effectiveness of the co-ordination mechanisms

The synergy with the stakeholders will be ensured through contacts with the "European Technological Platforms" and/or competent authoritative expert associations concerned (see Section 1.1). Here is their detailed list with website addresses ((1) and (2)):

(1) *European Technological Platforms (reactor safety, geological disposal, emergency management, radioecology, radiation protection, etc)*

- SNE-TP = "Sustainable Nuclear Energy Technology Platform" - <http://www.snetp.eu> and NUGENIA = "NUclear GENeration II & III Association" - <http://www.nugenia.org>
- IGD-TP = "Implementing Geological Disposal of Radwaste TP" - <http://www.igdtp.eu>
- NERIS = "European Platform on Preparedness for Nuclear and Radiological Emergency Response and Recovery" - <http://www.eu-neris.net>
- [NUGENIA = NUclear GENeration II & III Association \(1921 Belgian law\) - http://www.nugenia.org/](http://www.nugenia.org/)
- MELODI = "Multidisciplinary European Low Dose Initiative" - <http://www.melodi-online.eu>
- [ALLIANCE = European Radio-ecology Alliance \(since October 2012\) - http://www.er-alliance.org/](http://www.er-alliance.org/)
- [EURADOS = European Radiation Dosimetry Group in medical and industrial applications - http://www.eurados.org/en](http://www.eurados.org/en)
- *ENEF = "European Nuclear Forum Energy"*
http://ec.europa.eu/energy/nuclear/forum/forum_en.htm

(2) *Independent authoritative expert bodies with regulatory background (radiation protection, "stress tests", etc)*

- ENSREG = "European Nuclear Safety Regulators Group"
http://ec.europa.eu/energy/nuclear/ensreg/ensreg_en.htm
- WENRA = Western European Nuclear Regulators Association/ - <http://www.wenra.org>
- HERCA = "Heads of European Radiological protection Competent Authorities Association"
<http://www.herca.org/index.asp>

Equally important is to take advantage of the FP7 Euratom projects dedicated to nuclear education and training (Euratom Fission Training Schemes /EFTS/) in all nuclear fission areas (i.e. reactor safety, geological disposal, radiation protection). Some of these FP7 projects have already been terminated but, in most cases, the consortia are still alive and should be contacted in connection with NUSHARE. As of December 2013, on top of NUSHARE, there are nine such education and training "coordination actions" (see also ENEN website), namely:

- TRASNUSAFE - *Nuclear Safety Culture*: addressing mainly the health physics sector (e.g., ALARA principle) (Grant Agreement no 249674 / November 2010 - October 2014)
- ENEN III Training schemes - *Generation III and IV engineering*: addressing mainly the nuclear

systems suppliers (Grant Agreement no. 232629 / May 2009 – April 2013)

- CORONA - *Regional Center of Competence for VVER Technology and Nuclear Applications*: focusing on VVER (Grant Agreement no. 295999) / 1 December 2011 – 30 November 2014)
- GENTLE - *Graduate and Executive Nuclear Training and Lifelong Education*: focusing on synergy industry – academia (Grant Agreement no. 323304 / January 2013 – December 2017)
- CINCH-II - *Cooperation in education and training In Nuclear Chemistry*: focusing on the European master's degree in nuclear and radiochemistry (NRC) (June 2013 – May 2016)
- PETRUS III - *Implementing sustainable E&T programmes in the field of Radioactive Waste Disposal*: focusing on a “Competency-Based Curriculum” (August 2013 – July 2016)
- EUTEMPE-RX - *EUropean Training and Education for Medical Physics Experts in Radiology*: focusing on revised 2013 Council Directive on BSS (Sept. 2013 – August 2016)
- ENEN-RU II- *Cooperation with Russia in Nuclear Education, Training and Knowledge Management*: focusing on the mobility of teachers and students (March 2014 - Febr 2017)
- ENETRAP-III - *European Network on E&T in Radiological Protection*: addressing mainly the nuclear regulatory authorities and TSOs (March 2014 – February 2018).

A link shall also be established with the current KIC InnoEnergy and, in particular, with their Collocation Centre "Sustainable nuclear & renewable energy convergence" where business creation activities are coupled with Research & Innovation Projects as well as with Education and Training. Of particular interest is their partnership between universities (UPC, KTH, Grenoble INP and Paristech), major companies and research institutes (Vattenfall, AREVA, EDF, ENDESA, CEA). Also worth sharing is their experience (1) in providing access to and training on nuclear facilities of international interest and (2) in using regional funds for effective local and regional spill overs ("Cohesion Policy"), wherever applicable – (<http://www.kic-innoenergy.com/education/msc-programmes/msc-emine.html>).

The ENEN Members beyond the European Union, in particular in Japan and in the Russian Federation, have been informed on the proposed project and its background, objectives and expected outcomes. Their active participation (with their own human and financial resources) to the project in the design of concepts and ETI programmes will be actively pursued.

1.4 Work Plan

The following paragraphs describe the strategy and the details of the work plan.

1.4.1 Strategy of the Work Plan

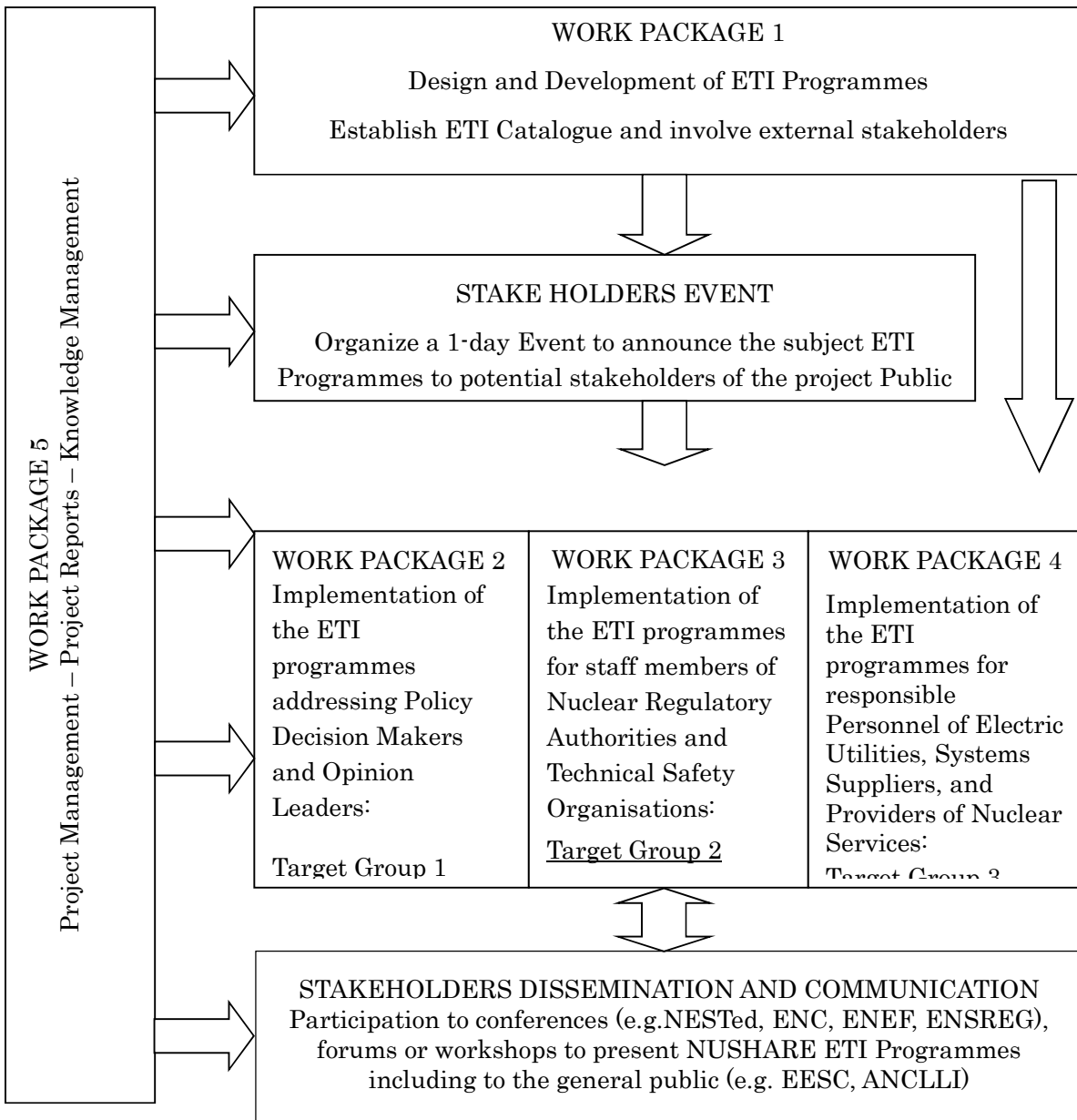
The strategy of the Work Plan is combining experience from existing courses, training programmes and workshops with a thorough analysis of current and future needs of main nuclear stakeholders in view of developing and implementing a consistent set of education, training and information programmes meeting the main NUSHARE objectives on the basis of an optimized use of resources. Examples of elements supporting this strategy are:

- Take advantage of training structures and initiatives of continuous professional development that have proven to be successful in EU (and IAEA and/or OECD/NEA) countries;
- Strengthen collaboration between universities, training providers, public bodies, regulators, utilities, and system suppliers in view of optimizing relevant education, training and information initiatives according to the needs of different stakeholders;
- Assess and document the acquired knowledge, skills and attitudes (competences) through the development of "Personal Transcripts" and "training passports" based on the mutual recognition of job profiles and qualifications, similar to what is already being done in other sectors (e.g. aeronautics and automotive as supported by DG EAC);
- Implement, wherever appropriate, the European Credit system for Vocational Education and Training (ECVET) in the nuclear fission sector, in order to enhance the lifelong learning process and the mobility of nuclear experts; this requires the formulation of training programmes in terms of units of "learning outcomes";
- Develop and maintain a quality assured website for FAQs on nuclear safety culture and for relevant education, training and information programmes;
- Organise by means of the project website ad-hoc workshops with safety culture specialists on demand;
- Steer the 1st phase of the project using a Task Force composed of key project participants (including the Work Package leaders) and external high-level experts closely related to relevant stakeholders and target groups;
- Nominate an Advisory Board composed of high-level representatives of relevant end users (including experts of non-EU countries and from non-nuclear sectors) as well as EU bodies/initiatives such as EU platforms and EU institutions (EC, staff from DG RTD/ JRC / ENER / EAC / DEVCO), EESC (European Economic and Social Committee).

1.4.2 Graphical representation and interdependencies

The relations between the Work Packages are shown in the figure below.

ETI = Education, Training and Information



1.4.3 Work packages components and time schedule

The project is organized in two slightly overlapping phases:

- a 1st phase is devoted to the identification of priorities, the development of concepts, the production of a catalogue of existing and new ETI programmes, and an action plan for implementation of programmes.
- The 2nd phase is devoted to the refinement and the implementation of selected programmes of the catalogue.

Expected outcome of Phases 1 and 2:

Phase 1 will be organized around:

- A design and development stage of ETI programmes taking into account existing ETI actions on-going in Member States and matching the needs recognized as essential for the development of a widely shared safety culture in Europe;
- Defining topics and (units of) learning outcomes for relevant sub-groups of TG1, TG2 and TG3;
- A “Stakeholders’ Seminar” with participation of “external” stakeholders representing training providers and end users of ETI actions sharing the NUSHARE objectives to support safety culture in view of discussing end user needs, required and available resources, and the involvement of stakeholders in the 2nd phase of the project;

In this first phase, the project will establish the status of existing ETI programmes in EU member states which are supporting the NUSHARE objectives and identify those priorities for possible new actions under the NUSHARE umbrella which are expected to provide most added values compared to the current status with the available financial resources. On this basis a coherent set of ETI programmes (e.g. training programmes offered by academic and/or industrial organizations) supporting the NUSHARE objectives and suitable for EU-wide applications will be established. This includes the identification of relevant topics and learning outcomes for target groups and sub-groups and the development of a sound concept for EU-wide dissemination and application. Required and available resources (both internal and external) will be reviewed and appropriate individuals and organizations (e.g. training organizations and trainers) will be identified who are willing and capable to implement and operate the NUSHARE ETI programmes in a long-term perspective.

A Task Force (defined in Section 2.1) will be established to steer the project until the end of this 1st phase by providing guidance on priorities and concepts, and by supporting the development of basic ETI programmes and the establishment of links with further stakeholder to be involved in the implementation phase.

Phase 2 is devoted to the refinement of selected ETI programmes for the three target groups addressed by the project, to their implementation in different EU Member States as well as to their validation and EU-wide dissemination.

For each Target Group, at least one pilot ETI programme session and an additional “confirmation” session will be organized and funded in the framework of the project. The Confirmation session will include the feedback received after the pilot session. Special attention will be devoted to the evaluation

methodology, and, in particular, to the assessment of the individual's learning outcomes that can lead to mutual recognition of the competences acquired. The sessions will be given in English and cover up to several weeks in total, including courses, workshops, round table discussions, practical training and technical visits. The participants will include representatives of the Target Groups as well as trainers and/or providers for the implementation of the respective ETI Programmes in EU member states in the respective national languages.

Phase 2 will include:

- Participation to identified stakeholders conferences (e.g. NESTet, ENC, ENEF, ENSREG), forums or workshops to present NUSHARE ETI programmes including to the general public (e.g. EESC, ANCLLI), representatives from “Energy” and “Research & Innovation”, organisations as indicated within the Communication Action Plan (CAP) of the project.

Organisation of Phases 1 and 2

Phase 1 is aimed at defining the Action Program for phase 2, as documented in the “NUSHARE ETI Catalogue” as well as in commitments of external stakeholders for supporting and/or participation in the 2nd phase of the project, thereby setting up the “NUSHARE support team”.

Work Package 1

- Establishment of the status
The status of existing ETI programmes in EU member states and supporting the NUSHARE objectives will be established.
- Priority setting
priorities will be defined with regard to target sub-groups and ETI action types in view of setting a focus for the ETI programmes to be developed which is compatible with available resources, the input of end users, and the expected engagement of external stakeholders.
- Development of ETI concepts and design of ETI programmes and methodologies for target groups and sub-groups.

As a first step, preliminary ETI programmes will be defined on the basis of the information on existing relevant ETI programmes (courses, workshops etc...) in EU member states and on recognized priorities with respect to new actions. Furthermore concepts will be developed for implementation, validation and dissemination of these programmes. Preliminary results of this work will be presented for discussion and suggestions during the Stakeholders Seminar, final results will be described in the NUSHARE ETI Catalogue.

Preparation and organization of the Stakeholders Seminar:

- Establish the list of “external” stakeholders (from EU member states, international organisations, and relevant non-EU countries) expected to share NUSHARE objectives and capable of contributing to the project;
- Propose a Table of Contents and/or a very preliminary version of the “NUSHARE Catalogue” of ETI Programmes, to be discussed and completed during the Stakeholders’ Seminar

- Send out invitations to attend, disseminate background information and make a preliminary survey of whom is interested to become a member of the “NUSHARE support team”.

Define the programme for phase 2

Use the results of the Stakeholders’ Seminar

- to produce final versions of NUSHARE ETI programmes for the three target groups,
- to establish the status of commitments of stakeholders, in particular of ETI providers, to participate in evaluation and confirmation of NUSHARE ETI programmes and in the operation or final programmes at the EU level or in their respective countries.

Special Event

- Contribute to the communication briefing for the Special Event covering the public announcement of this initiative and its program
- Organise the Special Event

Phase 2 will consist of deploying the program (pilot, confirmation and dissemination training sessions) and performing mainly classical project management tasks in addition to monitoring and evaluating the impact of the implemented training and information actions. The content of the Program will be fully described during the implementation of phase 2. Work packages 2, 3 and 4 will cover the activities of Phase 2.

Work Package 2

- Deploying and implementing the training programme and information sessions for Target Group 1

Work Package 3

- Deploying and implementing the training programme and information sessions for Target Group 2

Work Package 4

- Deploying and implementing the training programme and information sessions for Target Group 3.

Structure of Work Packages 2, 3 and 4

The deployment and implementation of the training programmes addressing the three target groups in respectively WP 2, WP 3 and WP4 will be done according to the following model.

Training programme pilot sessions

From the material collected and the development needs defined in Phase 1 the partners will construct a series of courses, training sessions, workshops and technical visits covering the major learning outcomes for the respective Target Groups. The delivery will be done in an optimized schedule over about one year from month 14 till month 26, and the combined duration of the sessions is expected to be several weeks for each Target Group. It will include mainly scientific-technological subjects, but

socio-economic subjects will be addressed as well in particular with respect to the mix of energy resources and their respective social, environmental, economic and public health impacts. Legal and juridical subjects and, in particular, their incorporation into the national and European legislations may be included because of their relevance to environmental releases, public health, waste management, international nuclear transports, etc. The Advisory Board will monitor and evaluate the project implementation around the 23th month (milestone M5.4). The sessions will be delivered by third parties (ENEN Members) and selected NUSHARE stakeholders (definition in Section 2.1).

The participants in the training programmes will be selected from the respective Target Groups to represent the EU countries with nuclear power plants and other nuclear fission applications in operation or under development. The number of participants will vary from 15 to 25. They should have a good command of the English language. Participants should be at a level to benefit from the training sessions with sufficient maturity to provide relevant feedback to the teachers / trainers and to actively participate to the dissemination of the course material in their respective countries (train the trainers). In those conditions, the initial delivery of the training programmes will really be pilot sessions and feedback received will be the basis for optimization and improvement of the training.

Training programme confirmation sessions

After incorporating the feedback and experience of the pilot sessions into the training programmes, a second edition will be delivered from month 26 to month 36. The sessions can address a larger number of participants and will be delivered by third parties and NUSHARE stakeholders. The participants will include some trainers who will disseminate the course material on a broad scale in their respective countries. The Advisory Board will monitor and evaluate the project implementation in the 35th month (milestone M5.5).

Further dissemination of the course materials and training programmes within the individual countries, preferably in their national languages, will be started during the last year of the project from month 37 till month 46. In this period the third parties will provide guidance and assistance to the NUSHARE stakeholders (“NUSHARE support team”) and other institutions in charge of the further dissemination of the course material and training programmes. In this phase of the project the industries (electric utilities and systems suppliers) and institutions producing nuclear energy and/or using nuclear applications will be targeted. The Advisory Board will monitor and evaluate the progress of the project around the 47th month (milestone M5.6). The final evaluation of the project and its impact in the different EU countries will be prepared and discussed in the final project meeting in the ultimate 48th month (milestone M5.7).

The implementation of the “pilot” as well as the “confirmation” session will be financed by the budget available in the framework of NUSHARE project. No registration fee will be requested from trainees following these sessions, whenever possible. The follow-up sessions at the national level will have to be organised and financed by the NUSHARE stakeholders and the trainees’ organizations or from national resources.

Incentives for the implementation of the training programmes

Incentives for the NUSHARE stakeholders to implement the confirmation sessions of the training programmes are the following:

- Communication of the two above-mentioned EU Commissioners during the one-day Special Event with the provisional title: “European Initiative for enhancing safety culture competences in Europe”. This communication will also address previous actions of the EC such as the creation of additional Euratom Fission Training Schemes) with the objective to foster specific training initiatives responding to the Fukushima accident.
- Some financial support can be provided from the project’s budget to NUSHARE stakeholders or training providers wishing to organize the “pilot” and “confirmation” session and providing feedback. Pedagogical material will be made available to facilitate this second edition of the training programme.
- At the end of the project, an international high level event (possibly with a press conference) will be organised by the Project Management Committee in collaboration with the EC to communicate on the achievements of the project. A country by country review of the identified actions, emphasizing the effort made by each country to develop the nuclear safety culture will be noted and perspectives for the future presented.

The follow-up Training Programme sessions will be implemented by NUSHARE stakeholders and training providers with very limited funding from NUSHARE budget. Incentives for NUSHARE stakeholders for the implementation of these sessions (mostly at the national level) are the following:

- The final task for WP2, WP3 and WP4 will be the evaluation and assessment of the Training Programme sessions that were implemented in the scope of the project. The objective of this final task is to make available a digital record on line or on a data storage device to disseminate the final pedagogical material to be used for the implementation of the follow-up Training Programme sessions. All material will be made available by the ENEN to any institution who agrees to deliver the Training Programme.
- Trainees could be asked to pay a moderate subscription fee to cover the expenses of this further implementation of the training programmes.
- The ENEN, through its website and with the help of its members, will advertise actively for the initiatives that will be undertaken as a follow-up of NUSHARE project to further enhance the safety culture competences in member states with nuclear facilities on their territory.
- According to the achievements in the framework of the project, press conferences could be organized at the opportunity of specific activities and milestones of the project.

Work Package 5

Project management

Work package 5 includes the project meetings such as the Kick-Off meeting, the Task Force meetings, the Project Management Committee meetings and Advisory Board meetings to monitor and guide the project implementation, and the final meeting. It also includes all administrative tasks involved in the project reporting, the distribution of the funding, the follow-up of the use of resources, the financial reporting and claims by the third parties, subcontractors and NUSHARE stakeholders.

Knowledge management, reporting and dissemination of results, achievements and outcomes

Work package 5 also covers the activities and resources related to the dissemination of the project results