



European Nuclear Education Network

Pedro Diéguez Porras
Secretary General
European Nuclear Education Network

4th UK Nuclear Academics Discussion Meeting



Sheffield, United Kingdom - September 9th, 2015

CREATION

The European Nuclear Education Network Association, ENEN, is an Association established as a non-profit international association under the French law of 1901 , on 22 September 2003, as a result of the “ENEN project” funded by the European Commission.

ENEN Association - Objectives

The main objective is the **preservation** and further **development** of expertise in the nuclear fields by **higher** Education & Training

- Promote and further develop the **collaboration** in nuclear education and training of students, researchers and professionals
- Ensure the **quality** of nuclear education and training
- Increase the **attractiveness** for engagement in the nuclear fields for students, researchers and professionals
- Promote **life-long learning** and career development at post-graduate or equivalent level

Acknowledgement by the European Union Council

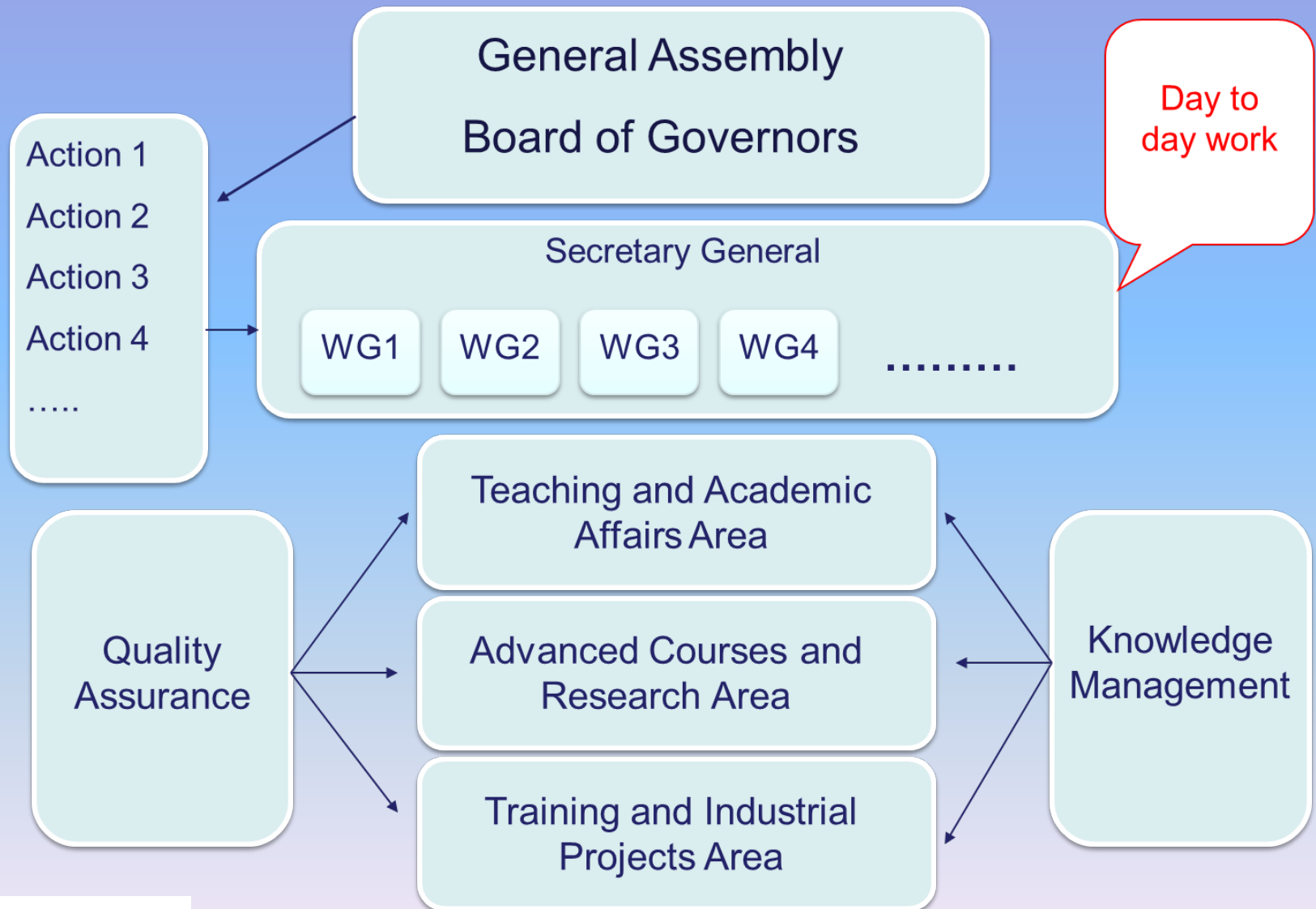
(1-2 December 2008)



*“The Council hopes that, with the help of the EU, **ENEN** and its members will continue to develop the coordination of nuclear education and training in Europe.*

*The Council welcomes the existence within the European Union of coordinated teaching and training leading to qualifications in the nuclear field, provided notably by the **ENEN**”.*

ENEN Structure



ENEN Structure

ENEN - BOARD OF GOVERNORS 2015-2016:

CIRTEN, Italy	Prof. Walter Ambrosini	President
Universidad Politécnica de Cataluña, Spain	Prof. Javier Dies	Vice President
Aalto University, Finland	Prof. Filip Tuomisto	Board Member
AREVA, France	Mr. Robert Geisser	Board Member
CEA-INSTN, France	Prof. Pascal Anzieu	Board Member
SCK-CEN, Belgium	Dr. Michèle Coeck	Board Member
Czech Technical University in Prague, Czech	Dr. Martin Kropik	Board Member
Imperial College London	Dr. Matthew Eaton	Board Member
Jozef Stefan Institute, Slovenia	Prof. Leon Cizelj	Board Member

ENEN GENERAL ASSEMBLY

EVERY YEAR FIRST FRIDAY IN MARCH

13th ENEN General Assembly in Helsinki, hosted by Aalto University.
ENEN Special Event on “Nuclear Waste Management & Geological Disposal”



The following European institutions are members of ENEN with voting rights at the General Assembly:

1	Atominstitut der Oesterreichischen Universitaeten	ATI	Vienna	Austria
2	Belgian Nuclear Research Centre	SCK•CEN	Mol	Belgium
3	Ghent University	UG	Ghent	Belgium
4	Katholieke Universiteit Leuven	KUL	Leuven	Belgium
5	Université Catholique de Louvain	UCL	Louvain-la-Neuve	Belgium
6	Université de Liège	ULG	Liege	Belgium
7	Université Libre de Bruxelles	ULB	Brussels	Belgium
8	Vrije Universiteit Brussel	VUB	Brussels	Belgium
9	Westinghouse Electric Company	WEC	Brussels	Belgium
10	CV Rez	CVRez	Prague	Czech
11	Czech Technical University in Prague	CTU	Prague	Czech
12	Aalto University School of Science and Technology	AALTO	Helsinki	Finland
13	Lappeenranta University of Technology	LUT	Lappeenranta	Finland
14	AREVA	AREVA	Paris	France
15	CEA/INSTN Centre d'Etudes de Saclay	CEA/INSTN	Saclay	France
16	Centre National de la Recherche Scientifique	CNRS	Paris	France
17	Ecole des Mines de Nantes	EMN	Nantes	France
18	Institut National Polytechnique de Grenoble	INPG	Grenoble	France
19	Institut Régional Universitaire Polytechnique	IRUP	Saint Etienne	France
20	Institut Supérieur des Techniques de la Performance	ISTP	Saint Etienne	France
21	Université de Lorraine	ULR	Nancy	France
22	Institute of Nuclear Fuel Cycle, RWT Aachen University	INBK	Aachen	Germany
23	Karlsruhe Institute of Technology	KIT	Karlsruhe	Germany
24	Ruhr Universität Bochum	RUB	Bochum	Germany
25	Technische Universitaet Muenchen	TUM	Munchen	Germany
26	Universitaet Stuttgart	IKE	Stuttgart	Germany
27	J. W. Goethe Universität	IAPFU	Frankfurt	Germany

The following European institutions are members of ENEN with voting rights at the General Assembly:

28	Aristoteles University	AUTH	Thessaloniki	Greece
29	Budapest University of Technology and Economics	BME	Budapest	Hungary
30	Consorzio Interuniversitario per la Ricerca Tecnologica Nucleare	CIRTEN	Pisa	Italy
31	SOGIN	SOGIN	Rome	Italy
32	AGH-University of Science and Technology	AGH	Krakow	Poland
33	Instituto Superior Tecnico	IST	Lisbon	Portugal
34	National Institute "Horia Hulubei"	IFIN-HH	Bucharest	Romania
35	University Politehnica Bucharest	UPB	Bucharest	Romania
36	Slovak University of Technology in Bratislava	STU	Bratislava	Slovakia
37	Jozef Stefan Institute	JSI	Ljubljana	Slovenia
38	University of Ljubljana	UL	Ljubljana	Slovenia
39	Technical University of Catalonia - Barcelona Tech	UPC	Barcelona	Spain
40	TECNATOM	TECNATOM	San Sebastián de los Reyes	Spain
41	Universidad Nacional de Educacion a Distancia	UNED	Madrid	Spain
42	Universidad Politecnica de Madrid	UPM	Madrid	Spain
43	Chalmers University of Technology	CUT	Goteborg	Sweden
44	Royal Institute of Technology	KTH	Stockholm	Sweden
45	Uppsala Universitet	UU	Uppsala	Sweden
46	Swiss Federal Institute of Technology Lausanne	EPFL	Lausanne	Switzerland
47	Swiss Federal Institute of Technology Zürich	ETH	Zurich	Switzerland
48	Delft University of Technology	DUT	Delft	The Netherlands
49	Imperial College London	ICL	London	United Kingdom
50	University of Birmingham	UB	Birmingham	United Kingdom
51	University of Central Lancashire	UCLAN	Preston	United Kingdom
52	University of Manchester	UM	Manchester	United Kingdom
53	Univesity of Hertfordshire	UH	Hatfield	United Kingdom

The following institutions from outside Europe are considered ENEN Member, without voting rights at the General Assembly, by concluding a Memorandum of Understanding:

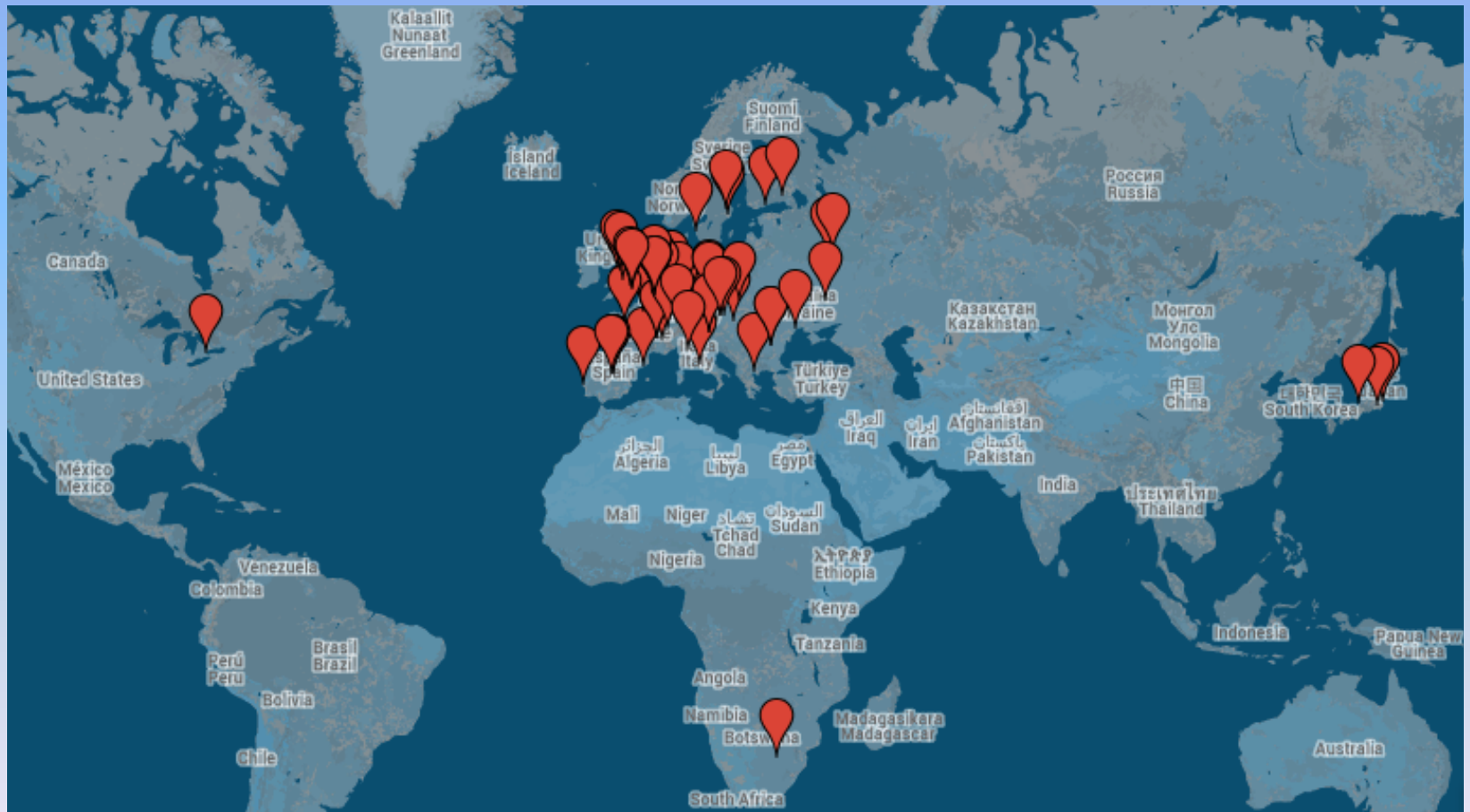
54	Japan Atomic Energy Agency	JAEA	Tokai	Japan
55	Tokyo Institute of Technology	TokyoTech	Tokyo	Japan
56	University of Fukui	FUKUI	Fukui	Japan
57	Central Institute for Continuing Education and Training	CICET	Obninsk	Russia
58	Moscow Engineering Physics Institute (State University)	MEPhI	Moscow	Russia
59	North West University	NWU	Potchefstroom	South Africa
60	Odessa National Polytechnic University	ONPU	Odessa	Ukraine
61	V. N. Karazin Kharkiv National University	KKNU	Kharkiv	Ukraine

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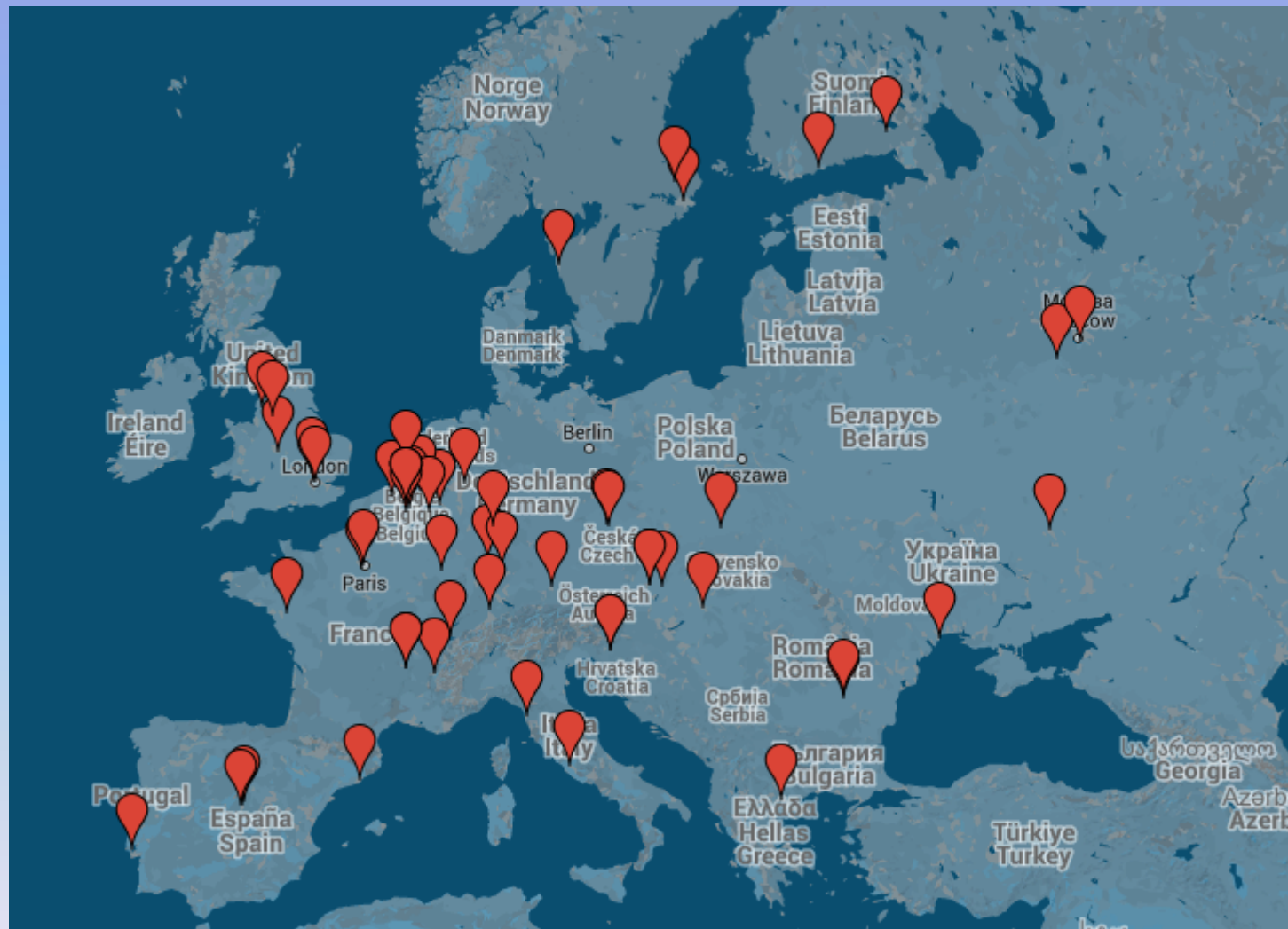
62	International Atomic Energy Agency	IAEA	Vienna	Austria
63	European Nuclear Society	ENS	Brussels	Belgium
64	University Network of Excellence in Nuclear Engineering	UNENE	Ontario	Canada
65	Joint Research Centre of the European Commission	JRC	Europe	Europe
66	World Nuclear University	WNU	London	United Kingdom
67	Fusenet	FUS	Europe	Europe

ENEN Members in March 2015

67 Members from 24 Countries:
6 Research Centers, 5 Companies, 50 Universities
and 6 international institutions



ENEN Members in March 2015



ENEN Members from United Kingdom

Imperial College London

University of Birmingham

University of Central Lancashire

University of Manchester

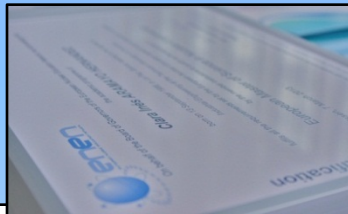
University of Hertfordshire

World Nuclear University - WNA



1. ENEN' ACTIONS

EMSNE Certification



PhD Event & Prize

Competitive and friendly presentation of research in Nuclear fields.
12 Finalists, of which 3 winners



This year was held in ICAPP'2015

Signature of Practical Arrangements with IAEA



2009



2013

Networking
E & T
K. Mg.



Master level : European MSc in Nuclear Engineering

- Established under the European Commission since 2005
- Quality and international mobility at international level
- Common reference curricula and mutual recognition among ENEN members
- Promotes and facilitates mobility of students and teachers



Master level: European MSc in Nuclear Engineering

➤ Requirements

- At least 5 years university education (3+2, 4+1, or 5).
- At least 60 ECTS must be “purely nuclear”
- 20 ECTS must be obtained from a “foreign” institution, member of the ENEN Association
- Master thesis

➤ List of topics:

- Reactor engineering
- Reactor physics
- Nuclear thermal hydraulics
- Safety and reliability of nuclear facilities
- Reactor engineering materials
- Radiology and radiation protection
- Nuclear fuel cycle and applied radiochemistry

EMSNE Award Ceremony



EMSNE 2013 ceremony held during the 58th IAEA General Conference in Vienna, Austria, on 25 September 2014.

European Master in Innovation in Nuclear Energy (EMINE)

- In the frame work of the European Institute of Technology –KIC InnoEnergy.
- **Duration:** 120 ECTS, two years.
- **Language:** English
- **Mobility track:**
 - First year: at UPC (Barcelona, Spain) or KTH (Stockholm, Sweden)
 - Second year: at Grenoble INP (Grenoble, France) or Paris (France)

European Master in Innovation in Nuclear Energy (EMINE)

30 Scholarships / year

- For European students:
 - + 750 Euro/month, during 2 years= 18.000 euros
 - + Tuition fees: 8.000 euros for the two years
 - = Total: 26.000 euros**
- For Non European students:
 - + 750 Euro/month, during 2 years= 18.000 euros
 - + Tuition fees: 16.000 euros for the two years
 - + Travel expenses: up to 1000 euros
 - = Total: 35.000 euros**

European Master in Innovation in Nuclear Energy (EMINE)

- **Academic partners:** Grenoble INP, UPC-Barcelona-Tech, Paristech, KTH, CEA
- **Industrial partners:** EDF, ENDESA, AREVA, Vattenfall
- Students from: France, Spain, Sweden, USA, India, Lebanon, Argentina, Belgium, China, Egypt, Ghana, Indonesia, Italy, Mauritius, Ethiopia, Bangladesh. Montenegro, Norway, Germany, Poland, Turkey, Vietnam.

<http://www.kic-innoenergy.com/emine/home/>

PhD level: Annual ENEN PhD Event & Prize

- One-day event during an international conference
- 3 ENEN Prizes of 1.000€
- 12 PhD students:
 - 1st at International Youth Conference on Energetics 2007 in Budapest, Hungary, 2007
 - 2nd at International Youth Nuclear Congress (IYNC) in Interlaken, Switzerland, 2008
 - 3rd at International Youth Conference on Energetics 2009 in Budapest, Hungary, 2009
 - 4th PhD event, ENC 2010, Barcelona June 2nd, 2010
 - 5th PhD event, ICAPP 2011, Nice May 4th, 2011
 - 6th PhD event, Inter. Conf. Nuclear Energy for New Europe in Ljubljana, 2012
 - 7th PhD event, Int. Conf. on Emerging Nuclear Energy Syst. (ICENES), in Madrid, 2013.
 - 8th PhD event, in IYNC 2014, in Burgos, Spain, 2014.
 - **9th ENEN PhD Event & Prize took place in the framework of the International Congress on Advances in Nuclear Power Plants, ICAPP2015, in Nice, France, 5-6 May 2015**



PhD level: Annual ENEN PhD Event & Prize

9th ENEN PhD Event & Prize took place in the framework of the International Congress on Advances in Nuclear Power Plants, ICAPP2015, in Nice, France, 5-6 May 2015

The **3 Winners** of the ENEN PhD Event & Prize 2015 were:

- **Elisa CAPELLI**, "Thermodynamic characterization of the Molten Salt Reactor fuel", JRC ITU/TU Delft, Germany/The Netherlands.
- **Alessandro MARINO**, "A mass transfer correlation for packed bed of lead oxide spheres in flowing lead-bismuth eutectic at high Peclet numbers", SCKCEN/Vrije Univ. Brussels, Belgium.
- **Christopher COOLING**, "A Summary of The Development of Point Kinetics Model for the Simulation of the Medical Isotope Reactor", Imperial College London, United Kingdom.



Signature of Practical Arrangements with IAEA



2009



2013

- “Promoting nuclear knowledge management, human resources development and capacity building in Europe through regional networking
- Sharing information and material in Europe between the IAEA and ENEN for the benefit of students and professionals
- Exploring opportunities to participate jointly in activities such as meetings, symposia, workshops
- Exploring opportunities for developing and sharing joint publications and material including e-learning contents”
- Other ...

Signature of Cooperation Agreement with other IAEA's regional networks AFRA-NEST, ANENT and LANENT



in September 2013

2. PROJECTS



Project proposed by:

- Commissioner for Research and Innovation
- Commissioner for Energy

after the Great East Japan Earthquake and Tsunami in 2011.

OBJECTIVE: to develop and implement
Education, Training and Information programmes
strengthening competences required for achieving
excellence in **NUCLEAR SAFETY CULTURE.**

From January 2013 to December 2016, a 4-years action!

EUROPEAN NUCLEAR EDUCATION NETWORK



Single Beneficiary of NUSHARE



Target Group 1

**Policy decision
makers &
opinion leaders**



Target Group 2

**Nuclear
Regulatory
Authorities &
TSOs**



Target Group 3

**Electric utilities,
suppliers, &
providers of
Nuclear services**



- Development of concepts and basic programmes
- **NUSHARE Catalogue** (NSC training courses - live document)
It includes **45 offers** for E.T.I. schemes offered **by 20 providers**
- **Stakeholders' Meeting** (Brussels, March 13-14, 2014)



- **Implementation of Information & Training actions 2015-2016**

*Contribution to the **Hearing on the new European Nuclear Safety Directive** in the Committee on Industry, Research And Energy (ITRE) in the EU Parliament*



in February 2014

“ENEN defended the support to the Education and Training in the nuclear field as a necessary contribution to assure the Nuclear Safety throughout Europe and beyond, together with the promotion of a healthy Nuclear Safety Culture”.

*“The **NUSHARE Project**, as a service to the European citizens, aims at enhancing and better spreading of nuclear safety culture principles, in line with the emphasis on this aspect in the proposed amendments to the new Nuclear Safety Directive”.*

FP7 European Fission Training Schemes

PETRUS II (Jan.2009–Jan.2012) and **PETRUS III** (Aug.2013–Jul.2016)
Implementing sustainable E&T programmes in the field of
Radioactive Waste Disposal. Focus on “Competency-Based Curriculum”



FP7 European Fission Training Schemes

PETRUS II and III – Organization of the PETRUS PhD conference on underground storage with all the experts in the field. Free registration.

A banner for the PETRUS PhD Conference 2015. The top section features three logos: the University of Lorraine (a stylized 'U' and 'L' in a circle), the PETRUS logo (the word 'PETRUS' in blue with a small blue triangle to its right), and the MINES Nancy ARTEM logo (a stylized fan-like shape above the text 'MINESnancy ARTEM'). The background of the banner is a light gray map of Europe. The main title 'Petrus PhD Conference 2015' is centered in a large, bold, black font. Below it, the subtitle 'Programme for Education, Training and Research on Underground Storage' is centered in a smaller, blue font. At the bottom, three lines of text are centered: 'Date: 22nd June at 2.00 pm - 26th June at 12.00 am, 2015', 'Location: Université de Lorraine - Mines Nancy - France', and 'Topic: Radioactive waste management and disposal'. All three lines are underlined and in a blue font.

 UNIVERSITÉ DE LORRAINE | **PETRUS**  |  **MINESnancy ARTEM**

Petrus PhD Conference 2015

Programme for Education, Training and Research on Underground Storage

Date: 22nd June at 2.00 pm - 26th June at 12.00 am, 2015
Location: Université de Lorraine - Mines Nancy - France
Topic: Radioactive waste management and disposal

FP7 European Fission Training Schemes

FP7 PELGRIMM: PELlets versus GRanulates: Fuel for GEN IV, Irradiation, Manufacturing & Modelling (2012 – 2015)

Management of different kind of grants for students participating in the project:

- Research internships:
8000€ per student => a total of 64 000,00 €
- Attending a conference:
Average 2000€ per student => a total of 29 000,00 €
- Attendance to course/workshop:
Average of 1500€ per student => a total of 19 000,00 €

Other Projects Involving ENEN

- **Coordination of ENEN III** - Training schemes for Generation III and IV engineers. (2009 – 2013) – Use of ECVET system
- **EUROTRANS** Project *EUROpean Research Programme for the TRANSmutation of High Level Nuclear Waste in an Accelerator Driven System* (2005 – 2010)
- **ENETRAP II** - European Network on E&T in Radiological Protection: addressing mainly the nuclear safety authorities (2009 - 2012)
- **FP7 CORONA** Establishment of Regional Center of Competence for VVER Technology and Nuclear Applications (2011 – 2014)
- **FP7 CINCH-II** - Cooperation in education and training In Nuclear Chemistry: focus on the European master's degree in nuclear and radiochemistry (2013 – 2016)
- **FP7 EUTEMPE-RX** - EUropean Training and Education for Medical Physics Experts in Radiology: (2013 – 2016)
- **FP7 GENTLE** - Graduate and Executive Nuclear Training and Lifelong Education (2013 – 2017)

Cooperation beyond EU (FP7)

Coordination of ENEN-RU II - Cooperation with Russia in Nuclear Education, Training and Knowledge Management: focus on the mobility of teachers and students (July 2014 – July 2017)

Coordination of ECNET - Cooperation with China in Nuclear Education, Training and Knowledge Management: focus on the mobility of teachers and students (November 2010 – October 2012)

Bilateral Cooperation between Industrialised Countries

Coordination of EUJEP-2 Project (Japan) - Foster, organize and implement exchanges of European and Japanese Master level students with mutual recognition of credits (October 2014 – October 2017)

Bilateral cooperation-EUJEP-2 (Japan)

Objective: Foster, organize and implement exchanges of European and Japanese Master level students with mutual recognition of credits.

36 months from October 2014 to September 2017

	European Partners: <ul style="list-style-type: none">▪ ENEN (Coordinator)▪ INSTN - CEA▪ Univ. Politehnica Bucharest▪ SCK•CEN	Japanese partners: <ul style="list-style-type: none">▪ Tokyo TECH (Coordinator)▪ Kyoto University▪ University of Fukui▪ Japan Atomic Energy Agency	
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Mobility opportunities:

- EU: 20 students for a total of 100 months

Grant: 1500€ (trip) + 5000€ for a 5 months stay

8 faculty staff for a total of 16 weeks

- Japan: 20 students for a total of 100 months

18 faculty staff for a total of 36 weeks

Bilateral cooperation ENEN-RU II (Russian Fed.)

"Strengthening of Cooperation and Exchange for Nuclear Education and Training between the European Union and the Russian Federation"

36 months from July 2014 to July 2017

Coordinators: **ENEN**



and **ROSATOM**



Work Packages:

WP1: Nuclear competence building by E&T

WP2: ENEN-RU E&T Forum

WP3: Strengthening participation in Nuclear Education

WP4: Strengthening participation in Nuclear Training

WP5: E&T facilities, laboratories and equipments

WP6: Project management and Knowledge dissemination

Bilateral cooperation ENEN-RU II Project

PARTNERS ON THE EUROPEAN SIDE:

- European Commission
- European Nuclear Education Network Association (ENEN)
 - Belgian Nuclear Research Centre (SCK-CEN), Belgium
 - Ceske Vysoke Ucení Technické V Praze (CTU), Czech Republic
 - Centrum Vyzkumu Rez S.R.O (CV REZ), Czech Republic
 - Universität Stuttgart (IKE), Germany
 - Technische Universität München (TUM), Germany
 - Consorzio Interuniv; Nazionale per la Ricerca Tecnologica Nucleare (CIRTEN), Italy
 - University Politehnica Bucharest (UPB), Romania
 - Slovenska Technická Univerzita v Bratislave (STUB), Slovakia
 - University of Manchester (UM), United Kingdom

All ENEN Members will have an opportunity to contribute under the ENEN umbrella

PARTNERS ON THE RUSSIAN SIDE:

- State Atomic Energy Corporation “Rosatom”
- Consortium of ROSATOM Core Universities:
 - National Research Nuclear University “MEPhI” (NRNU MEPhI)
 - Obninsk INPE NRNU MEPhI
 - Rosatom Central Institute for Continuing Education and Training (ROSATOM-CICE&T)
 - Federal State Unitary Enterprise “State Scientific Centre of the Russian Federation – Institute for Physics and Power Engineering - A. I. Leypunsky” (FSUE “SSC RF – IPPE”).

ANNETTE

Advanced Networking for Nuclear Education and Training and Transfer of Expertise

Proposed logo:



General Characteristics

The *ANNETTE* Proposal has been submitted to the Euratom call under **NFRP-10** within September 17th, 2014

It required an effort spent during last spring (for the first ideas) and last summer

The proposal is worth an EC request of **2.5 MEuros**, with a total **cost** of about **3.2 MEuros**

An effort was made in order to involve the large number of **27 participants**, also owing to the focus on coordination of the first work package

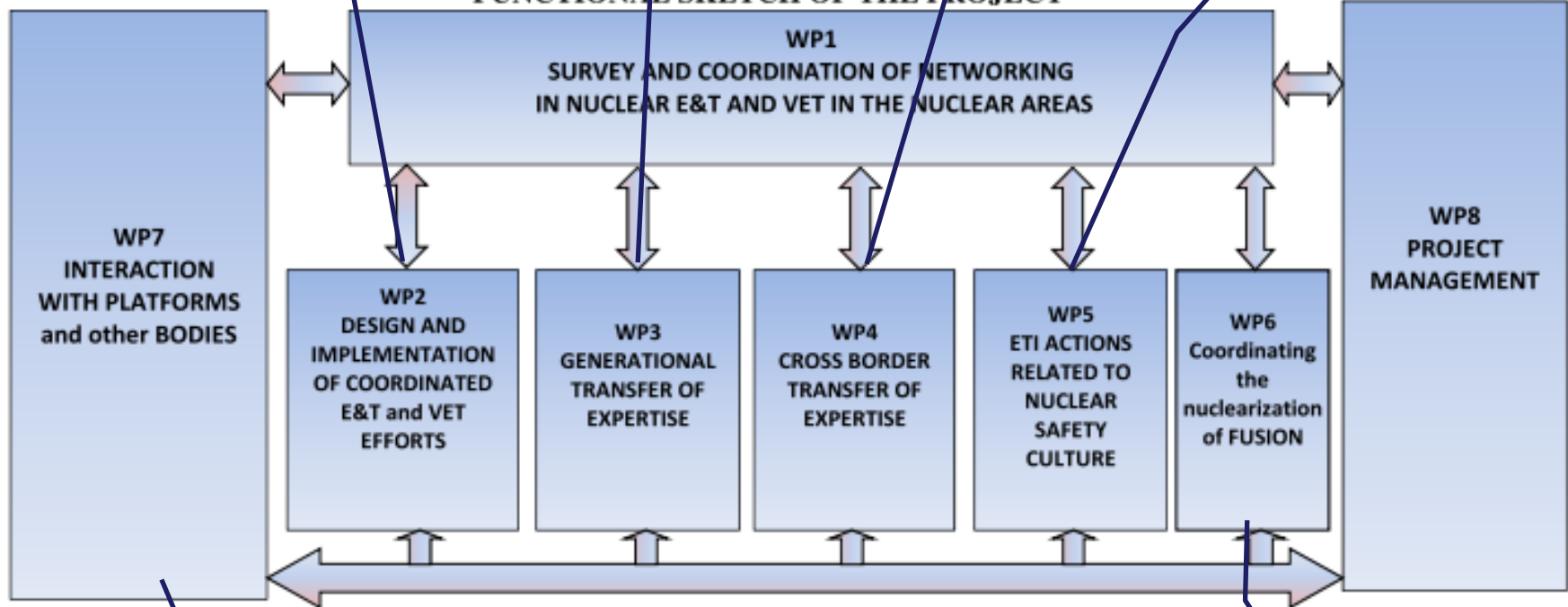
Master and
Summer
School for
CPD

Production
of teaching
material

ECVET
application
in industry

Initiatives for
NSC
enhancement

FUNCTIONAL SKETCH OF THE PROJECT




Contacts with
Platforms,
etc.

FuseNet asked to
join to coordinate
«nuclearization»

Thank you for your attention !

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