ENEN Challenges
in response to the industry, regulatory
and research needs

Joseph SAFIEH
ENEN Association
Plan

1. ENEN - History and development, Organisation
2. Some Achievements in Education, Training and Knowledge Management areas
3. Ongoing European projects in 2010
HISTORY and DEVELOPMENT

European Commission – EURATOM
5th Framework programme

**ENEN project** in January 2002 – December 2003

Following declarations and policies on phasing out nuclear power plants, nuclear sciences and disciplines are facing

- decreasing interest and a reduced numbers of students
- no successors for retiring professors
- discontinuing nuclear related courses and closing faculties

The “European Nuclear **Engineering** Network” project:

- established the basis for conserving nuclear knowledge and expertise
- created a European Higher Education Area for nuclear disciplines
- facilitated the implementation of the Bologna declaration in the nuclear disciplines
HISTORY and DEVELOPMENT

In order to ensure the continuity of the achievements and results of the ENEN project:

“The European Higher Education Area” in the nuclear field is formalised by creating the European Nuclear Education Network, the “ENEN” Association under the French law of 1901, on 22nd of September 2003.
ENEN - Objectives

The main objective is the preservation and further development of expertise in the nuclear fields by higher education and 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
It should be achieved by…

- Support to the Universities (exchange of students, lecturers, materials and information etc.)
- Making a bridge between the Universities and the End-users (industries, regulatory bodies, research centres, etc.)
ENEN Members in March 2010

- 56 members
  located in 18 European Countries
- MoU concluded with
  - IAEA for Asian Network (ANENT) and other items
  - European Nuclear Society
  - North West University, Potchefstroom, South Africa
  - Moscow Engineering Physics Institute, Russian Federation
  - Tokyo Institute of Technology, Japan
  - Japan Atomic Energy Agency, Japan
  - Central Institute for Continuing Education and Training Russia
- Memberships/cooperation under discussion with
  - EC Joint Research Centre, Ispra, Italy
  - University Network of Excellence in Nuclear Engineering Canada
HISTORY and DEVELOPMENT


ENEN established and implemented the European Master of Science in Nuclear Engineering

ENEN expanded its activities from education to training

ENEN organised and coordinated training sessions and pilot courses

ENEN expanded its activities to Knowledge Management

✔ FP6 **ENEN II project** Oct 2006 – March 2009

ENEN expanded its E & T activities to radiation protection, waste management and storage
Some Achievements in Education, Training and Knowledge Management areas
Master level: European MSc in Nuclear Engineering

- Established under the European Commission – EURATOM 5th FP ENEN project and 6th FP NEPTUNO project
- Common reference curricula and mutual recognition among ENEN members
- Promotes and facilitates mobility of students and teachers
- Definition and assessment of ENEN international exchange courses
- Implemented since 2005
- “ENEN Certificate” recognised among ENEN Members
EMSNE Certificates 2007-08
Master level : New Master in Switzerland

• A new program for a Master of Science degree in Nuclear Engineering
• Offered jointly by the Swiss Federal Institutes of Technology, EPF Lausanne and ETH Zurich.
• One semester course at each of the two university (Lausanne, Zurich),
• Master's research project will generally be carried out at the Paul Scherrer Institute (PSI)

Started in September 2008
Starting from September 2008

The objective of this “new” Nuclear Engineering speciality is to provide students with in-depth education in the field of nuclear reactors physics for the purpose of using existing tools, developing and constructing 3G reactors, and designing and developing the future systems.

**Internship: 5 months.**
MASTER OF SCIENCES NUCLEAR ENERGY

Physics Engineering

NRPE
Nuclear Reactor Physics and Engineering
Ex Nuclear Engineering

M1
Decommissioning and Waste Management

Operation

Fuel Cycle

Chemistry Engineering

M2
Nuclear plant design

Radiochemistry

Fuel Cycle Engineering

Careers: research via a PhD in general
engineering
International Exchange course

21 days’ course
Starting in September,
Equivalent to:
6 ECTS

http://www.reak.bme.hu/Wigner_Course/

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**Organising institutions**

- Budapest University of Technology and Economics (BME) Hungary
- Slovak University of Technology in Bratislava (STUB) Slovak Republic
- Vienna University of Technology, Atominstitut (AI) Austria
- Czech Technical University in Prague (CTU) Czech Republic
PhD level – Advanced courses

- Course 1: Reactor Multiphysics and Fuel Management
  from September 20 to September 24
- Course 2: Materials for Reactor Fuels and Structures
  from September 27 to October 1
- Course 3: Reactor Core Physics: Deterministic and Monte Carlo Methods
  from October 4 to October 8
- Course 4: Nuclear Measurements Tools and Techniques
  from October 11 to October 15
- Course 5: Reactor Kinetics and Reactor Dynamics
  from October 18 to October 22
- Course 6: Fuel Cycle Back-End and Reprocessing
  from October 25 to October 29
- Course 7: Nuclear Fuels (LWR, SFR, GCR)
  from November 15 to November 19
- Course 8: Uncertainty Quantification, Experimental Validation and Predictive Simulation
  from November 22 to November 26
- Course 9: The Scientific Basis of Nuclear Waste Management
  from November 29 to December 3
PhD level: Annual ENEN PhD Event

• One-day event during an international conference
• 12-14 PhD students
• ENEN Prize
• ENEN Alumni
  – 1st at International Youth Conference on Energetics 2007 in Budapest, Hungary, 1 June 2007
  – 2nd at International Youth Nuclear Congress (IYNC) in Interlaken, Switzerland, 23 September 2008 in collaboration with the EC JRC
  – 3rd at International Youth Conference on Energetics 2009 in Budapest, Hungary, 4-7 June 2009
  – 4th PhD event, ENC 2010, Barcelona June 2\textsuperscript{nd}, 2010
INTRODUCTION TO NUCLEAR FUEL CYCLE 2010

FRANCE
October 11th - 22nd 2010

ENEN Training Courses

CONFÉRENCE SUR L’ÉNERGIE NUCLEAIRE STRASBOURG 26 NOVEMBRE, 2010
Professional Training Programs
Professional Training Programmes
Professional Training Programmes

INTERNATIONAL COURSE ON RADIOACTIVE WASTE MANAGEMENT

6 – 10 November 2009

Organised at:

UNIVERSITY "POLITEHNICA" OF BUCHAREST
FACULTY OF POWER ENGINEERING
DEPARTMENT OF NUCLEAR ENGINEERING

Under EURATOM FP-6 projects:

ESORED - ENGINEERING STUDIES AND DEMONSTRATION OF REPOSITORY DESIGNS

and

ENEN - EUROPEAN NUCLEAR EDUCATION NETWORK

Conférence sur l’énergie nucléaire Strasbourg 26 Novembre, 2010
Knowledge Management
ENEN Website and Database

- **ENEN Website**
  http://www.enen-assoc.org

- **NEPTUNO Database** (Aug 2004-)
  http://www.neptuno-cs.de/

E&T courses by ENEN Members

- **A new ENEN Database**
  - E&T courses
  - Master program
  - PhD topics
  - Opportunities (scholarship, fellowship, internship, job opportunities)

provided by ENEN Members and Partners
Knowledge Management

ENEN publications

• First text book published under ENEN as a deliverable of ENEN II project
  – 18 chapters, 670 pages including exercises and solutions
  – mainly for students, young professionals and researchers
• CD-ROM including multimedia presentations for the general public
Ongoing European projects in 2010
1. Euratom Fission Training Schemes (EFTS)
   - ENEN III on Nuclear Engineering
   - ENETRAP II on Radiation Protection
   - PETRUS II on Waste Management and Disposal
   - TRASNUSAFE on Nuclear Safety Culture

2. Bilateral cooperation
   - EUJEP (Japan)
   - ENEN-RU (Russian Federation)
   - ECNET (China)
1. EFTS projects

- Projects on Euratom Fission Training Schemes starting in 2009/2010
- The objective is to establish a common certificate for professionals at the European level
  - ENEN III on Nuclear Engineering (2009-)
  - ENETRAP II on Radiation Protection (2009-)
  - PETRUS II on Waste Management and Disposal (2009-)
  - TRASNUSAFe on Nuclear Safety Culture (2010-)

**ECTS and European MSc for Education; WHAT for Training?**
ENEN-III Project on Nuclear Engineering

- FP7 Euratom Fission Training Schemes (EFTS)
- Three-year project: 2009 – 2012
- ECVET (European Credit system for Vocational Educational and Training) to be applied in the nuclear field?
- Four training schemes, as pilot subjects
  - Basic Nuclear Topics for Non-Nuclear Engineer
  - Design Challenges for Generation III NPP
  - Construction Challenges for Generation III NPP
  - Design Challenges for Generation IV Reactors
- 19 Partners in 12 countries, coordinated by the ENEN
Bilateral cooperation

EACEA EUJEP Project (Japan)

- Education, Audiovisual and Culture Executive Agency (EACEA)
- Two-year project: 2010 – 2012
- Exchange of Master students and faculty staff between 8 EU and 3 Japanese organisations
- From EU to Japan
  - 30 students for total 154 weeks
  - 10 faculty staff for total 19 weeks
- From Japan to EU
  - 30 students for total 180 weeks
  - 8 faculty staff for total 8 weeks
Bilateral cooperation
ENEN-EU Project (Russian Fed.) - 1

- Objective: to define a common basis to allow effective cooperation between the European and Russian networks for nuclear E&T

- 2-year project, under negotiation, hopefully to launch end 2010

WP1: Bologna process and ECTS in Russia

WP2: Needs of cooperation in the long term

WP3: Pilot items for Education

WP4: Pilot items for Training

WP5: E&T facilities, laboratories and equipments

WP6: Knowledge dissemination
Bilateral cooperation
ENEN-EU Project (Russian Fed.) - 2

Partners on the Russian side

- ROSATOM
- National Research Nuclear University
  - MEPhI
  - Obninsk Technical University etc.
- Research Institute for Nuclear Reactor, Dimitrovgrad
- Centre Institute for Continuing Education and Training, Obninsk etc.

Partners on the EU side

ENEN, SCKCEN, CTU, REZ, IKE, UPB, SUTB, TECNATOM

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

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 insists that the appropriate conditions must be created for mutual recognition of nuclear professional qualifications throughout the European Union.

The Council encourages the Member States and the Commission to establish a "review of professional qualifications and skills" in the nuclear field for the European Union, which would give an overall picture of the current situation and enable appropriate solutions to be identified and implemented.
THANK YOU FOR YOUR ATTENTION

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