WORLD NUCLEAR UNIVERSITY

A better future for nuclear

Presentation to the Japan Nuclear HRD Network Annual Meeting
10 February 2016

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Presentation Content

1) Introduction – the WNU

2) Lessons from Japan

3) Brazil: lessons from a radiological accident in urban area

4) Challenges for decision makers in emergency situations – competencies required

5) Nuclear energy in the future needs harmonization

6) Interregional cooperation for training – the Summer Institute

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IAEA
International Atomic Energy Agency

NEA
NUCLEAR ENERGY AGENCY

A global network committed to enhancing international education and leadership in the peaceful applications of nuclear science and technology

WORLD NUCLEAR ASSOCIATION

W A N O

The WNU values

WNU provides excellent education by:

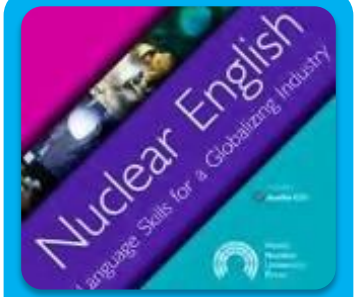
- Promoting lifelong learning and networking opportunities
- Continuous improvement of performances and outcomes
- Fostering international collaboration for expanding learning networks
- Maintaining diversity in learning environments, cultures and people
- Providing equal opportunities and fair treatment in all programmes
- Clear and fast communications
- Using creativity and innovation in engaging fellows, faculty, and collaborators
- Being passionate to manage the programmes with utmost efficiency
- Demonstrating integrity, teamwork, professionalism, respect and leadership

WNU Programmes

Summer Institute

Radiation Technologies School

Short Course



Nuclear English Course

School of Uranium Production

Nuclear Olympiad

WNU Summer Institute

2016 Marks the WNU's 12th Anniversary

- 2005: Idaho Falls, US
- 2006: Stockholm, Sweden
- 2007: Daejeon, Korea
- 2008: Ottawa, Canada
- 2009 - 2014: Oxford, UK
- 2015: Uppsala, Sweden
- 2016: Ottawa, Canada

WNU Summer Institute Alumni Assemblies

Vienna, 2012

Oak Ridge, 2014

Beijing, China, 18-22 April 2016

WNU Short courses

Mongolia

Turkey

South Korea

China

Jordan

Malaysia

Singapore

Brazil

South Africa

Argentina

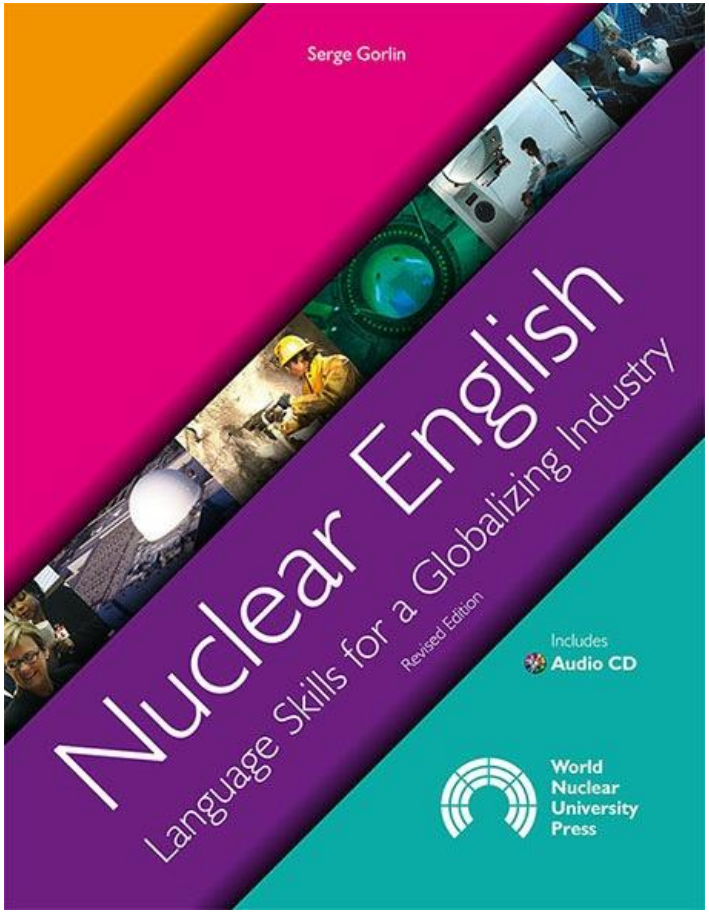
535 participants in 2015

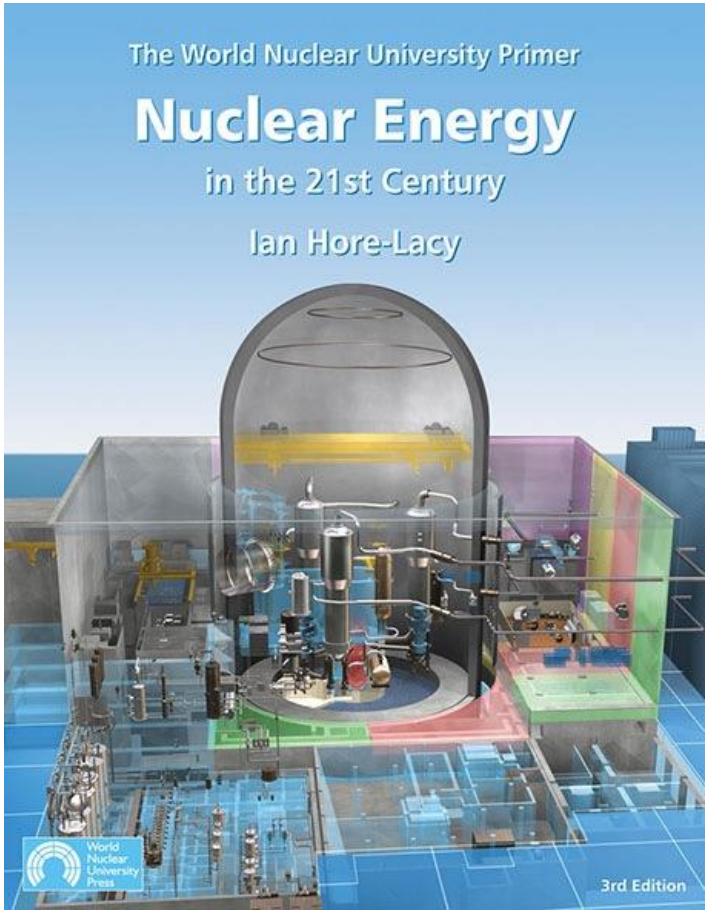
Nuclear English Course

- Learn English in a nuclear-specific context
- Based on the book: Nuclear English, by Serge Gorlin

Brazil, May 2014

WNU Press


Serge Gorlin
Nuclear English
Language Skills for a Globalizing Industry
Revised Edition
Includes
Audio CD
World
Nuclear
University
Press


The World Nuclear University Primer
Nuclear Energy
in the 21st Century
Ian Hore-Lacy
3rd Edition

WNU-IAEA Nuclear Olympiad 2016

The World Nuclear University (WNU) and International Atomic Energy Agency (IAEA) Nuclear Olympiad is an international challenge for undergraduate and graduate students on nuclear techniques for global development. This is a unique opportunity for students to showcase originality, creativity, and knowledge on nuclear sciences and applications and how these enhance the quality of life. By participating in Nuclear Olympiad, students have the opportunity to connect with nuclear organizations and find out more about a career in nuclear science and technology.

For 2016, one finalist from each region, as well the university professor who provided their reference letter, will be awarded with travel to Vienna for the final stage of the Nuclear Olympiad!

The challenge - first stage!

- Create a video up to sixty seconds long on technical, economic or social aspects on the topic "Production of Radionuclides for Global Development".
- For 2016 the video can be in a local language, provided it is subtitled in English.
- Post your video to YouTube (or YouKu if you are in China) and promote it online to get the most likes.
- Before **11 March 2016**, submit the link to the WNU website with a university professor recommendation letter (submission page will open in 2016).
- The WNU will notify the authors of the accepted videos by email.
- On **19 May 2016,** the likes for each video will be counted and the five most liked videos per region will qualify for the next stage.

The challenge - second stage

- The second stage will run in parallel in the following regions, in collaboration with institutions engaged in nuclear applications:

- Africa and Middle East
- Asia
- China
- Europe
- Latin America and Caribbean
- North America
- Oceania

The semi-finalists (five most liked videos per region) will be interviewed by video conference about the topic of their video

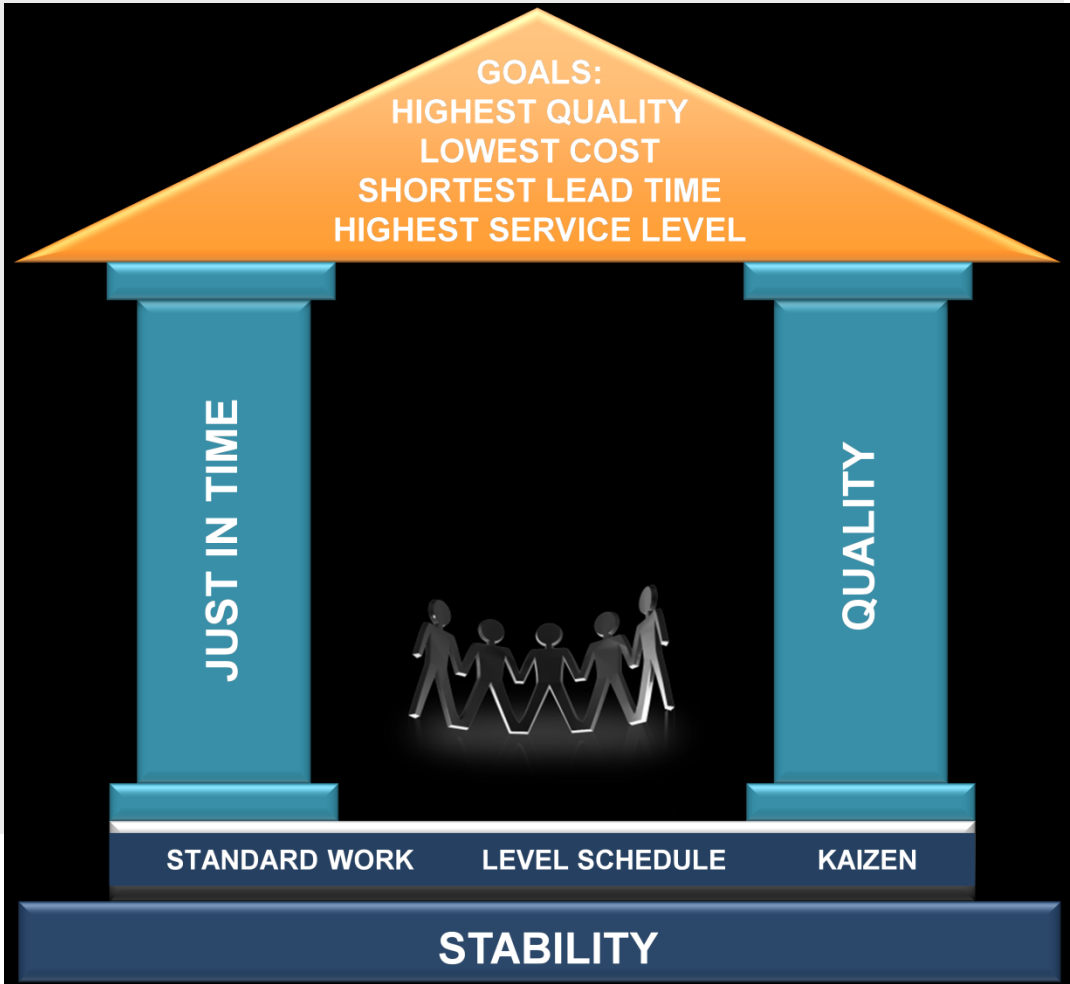
What has the world learned from Japan?

What has the world learned from Japan?

Many essentials for the quality of life: health, education, security, food

Technology develops fast and industry attends the demand due to the Japanese Industrial Revolution

The lean manufacturing took over the mass production



Inspiration: Toyota Production System

The key managerial values and attitudes needed to sustain continuous improvement in the long run.

1. **Challenge**: Having a long term vision of the challenges: "what we need to learn"
2. **Kaizen**: It is never good enough, no process can ever be thought perfect, so operations must be operations must be improved continuously, striving for innovation and evolution.
3. **Genchi Genbutsu**: Going to the source to see the facts directly to make the right decisions. decisions.
4. **Respect**: Taking every problem seriously, and making every effort to build mutual trust. trust.
5. **Teamwork**: Team problem-solving. The idea is to develop and engage people through their through their contribution to team performance.

Customer focus approach, flexibility

The key to Toyota's success is the **customer-focus** that requires quick reactions when consumer tastes changes.

Flexibility - Several different models can be produced on the same assembly line.

As the market grows and shifts so quickly, Toyota was able to respond and anticipate where things are going




A case study on leadership and decision making during emergencies

THE RADIOLOGICAL ACCIDENT IN GOIANIA, BRAZIL, 1987


Césio 137:
anos de insegurança nuclear
GREENPEACE

Timeline 1987

13/9
Cs source stolen

29/9
3pm call CNEN

29/9
6pm team dispatched

01/10 main piece shielded

Clean up work

31/12 – emergency is over

Right Decisions

are easier to be communicated
during a radiological emergency

#1: Phases & Actions

phase 1

- evacuation
- control of the spread of contamination
- protection of the team
- medical care
- leadership

phase 2

- clean up
- protection of the team
- population screening
- medical care
- waste management

Emergency is over!!

phase 3

- decontamination of small spots
- environmental control
- waste repository
- new regulations, collection of disused sources
- Liability and compensation scheme

Top Priorities

- Care of the affected population
- Return to normal situation:
  - Set up infrastructure ($): equipment, materials, logistics
  - Define clean up criteria
  - Define location for the waste from the clean up
  - Network for collaboration : private, state, national and international organizations with honest intentions
- Communicate with victims, public, media, emergency workers, politicians, other regulators

400 emergency workers

#2: WHO?

Great Leaders (and communicators) make the difference

Rex Nazareth
CNEN
President

Rozental
CNEN Director
for Licensing
and Control
“Goiania citizen”

#3: Where are the pieces of the source??

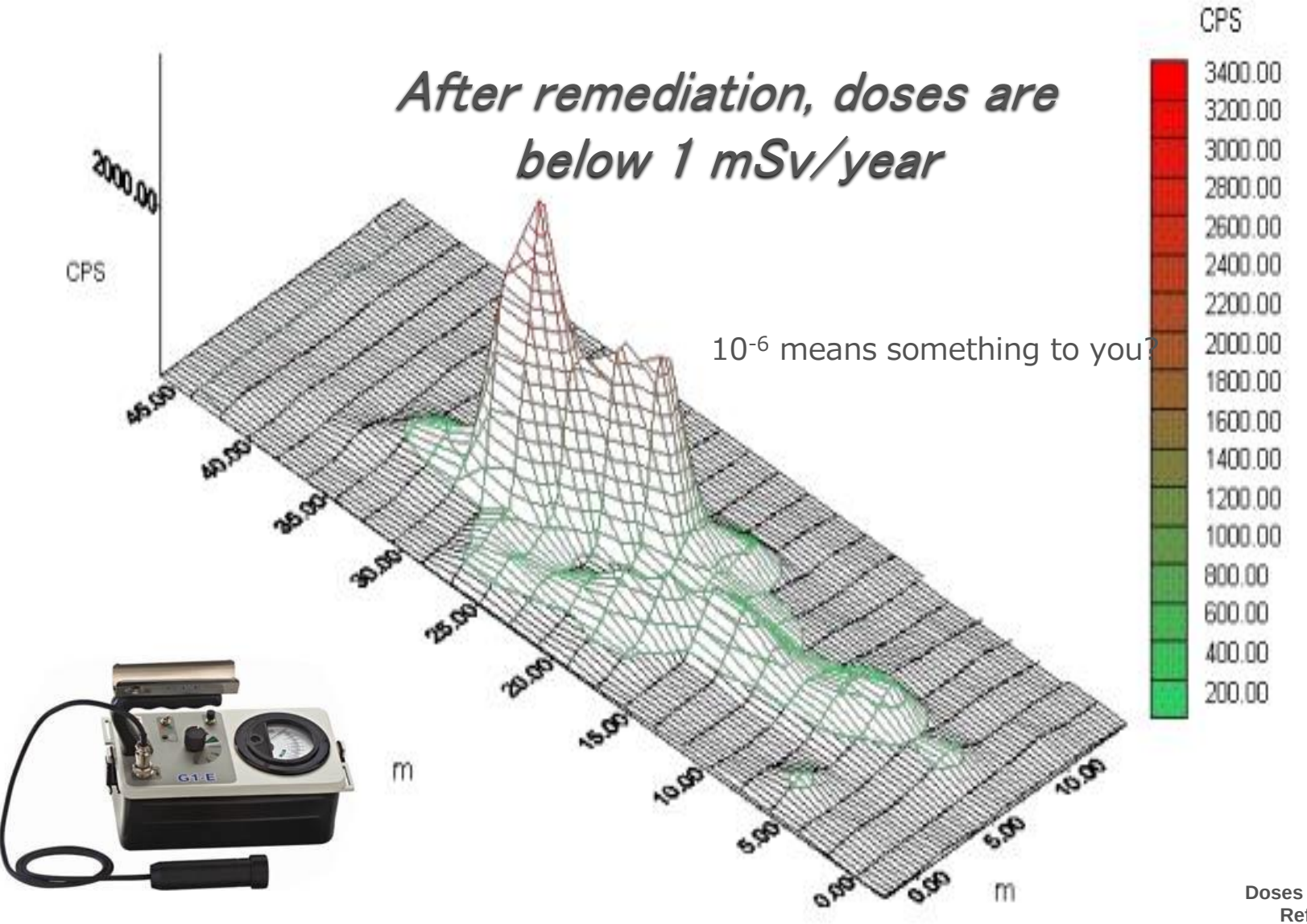
#4: Clean up criteria

Equity = good for you, good for me

Background level. It was not possible to defend any reference level above the bkg

Daily limit for workers : 1.5 mSv

#5: How to show results?



10^{-6} means something to you?

Doses at scrapyard III.
Ref. CNEN/IRD

#6: Keep it high: Communication with emergency workers

- Different groups, perceptions, skills, health, etc.
- Overnight meetings
- Clean up criteria

#7: Logistics: Suitable materials for safety

#8: Waste Repository Site Selection

3.500 m3 waste repository: The provisory became permanent

About 10 years later

Photo: P. Pavlicek– IAEA

#9: The right to know what is happening

is acknowledged, but safety first!

#10: Public commotion requires sometimes unconventional solutions

What if there were victims?


700 kg

emergency

Doesn't help	YES, PLEASE
x Delayed decisions	Approved clean up criteria beforehand
x Political/electoral speeches	Network for safety and social
x Emergency workers strike for better salaries	Operationally experienced and credible leaders
x "Rolling heads" threat	Open support from high level
x Academic discussions	Reliable infrastructure
x Bad infrastructure	Solidarity
x Distance from victims	NGO's fair collaboration
x NGO's with non-calibrated detectors	

How safe is safe enough?

Effective safety paradigm	
A natural disaster caused a nuclear plant to go wrong in Japan, killing nobody as a result of radiation	enforced the political idea of closure of German nuclear industry.
A chemical explosion in Tianjin, China, kills about 200 people	result no effect on German chemical industry.

Ensure global nuclear safety

Confidence in management of nuclear technology and operations

Stakeholder trust

Risks in perspective

Leadership

Time for an effective safety paradigm

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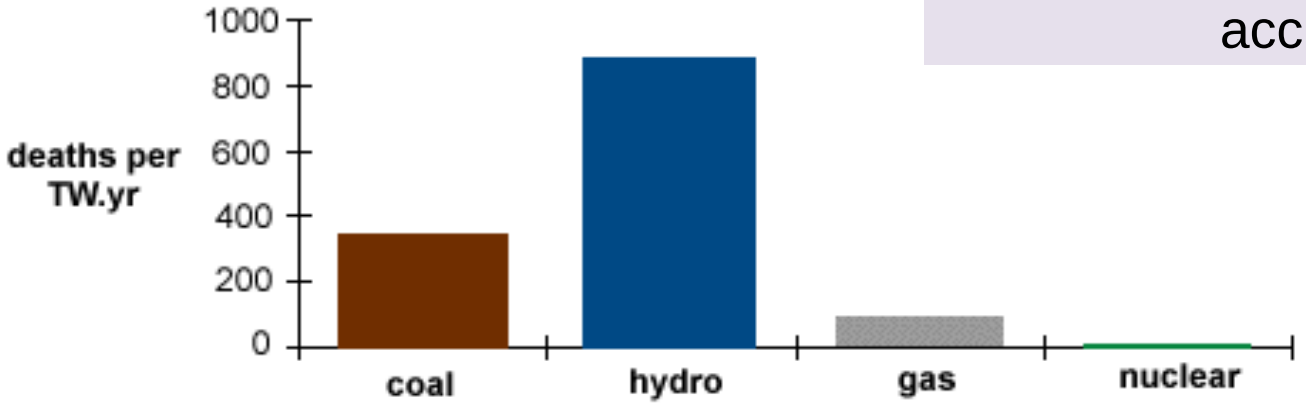
The alternatives to nuclear are far more dangerous – even including accidents



Paul Scherrer Institut 1998:
considering 1943 accidents with more than 5 fatalities

Smog in Beijing

Coal mine disaster (Soma, Europe, 2014)

Deepwater Horizon oil spill Mexico Gulf (2010)

Gas Explosion Near Trans-Siberian Railway Kills Hundreds (1989)

Challenges for leadership development

"Senior management should develop and maintain leadership competencies at all levels in the organization…." IAEA Safety Standards

- Typical characteristics of leaders
- Identification of potential leaders for emergency situations
- Creation of suitable environment for leadership development
- Preparing and motivating leaders - the role of Human Resources Department

Considerations on senior management technical knowledge

- The decision maker should have the minimum knowledge and be able to form inferences about the **causal connections of events** and on the relevant characteristic of the **context.**
- Excessive and unnecessary protective measures are avoided and the decision making process is faster when the senior manager has **familiarity with the installations and good understanding of the principles of radiation protection.**
- Lessons learned from past accidents **(IAEA summary reports).**

Considerations on senior management technical knowledge

Clear and concise publications and web links with easy and understandable essential topics - Apps

Visit to all nuclear installations

High level seminars about lessons learned from past accidents

Considerations on senior management skills: communications and crisis management

- Since day 1 of an emergency, the senior managers need be able to **talk to the media**.
- Foster open communication within the organization and to keep emergency workers moral high, **motivation the team** in extraordinary stressful situation.
- It is fundamental to know the **legal competencies** and the role of each other organization collaboration in the emergency response, with which the senior manager is more likely to interact

Considerations on senior management skills: communications and crisis management

- Media training, including TV live interviews
- Emergency simulation exercises and public hearings
- Role-playing sessions with professional actors to learn how to deal with people that react aggressively or panic
- Listen to first hand experience
- Keep international network

Considerations on senior management attitudes for crisis management

- Transparency and openness to listen to concerns
- Focus to solve the situation
- Demonstrate responsible actions towards safety and population well being
- Quick thinking
- Self-confidence and keep belief to nuclear energy
- Do not underestimate the situation and care about the people
- Continuously monitor the emergency response

Nuclear energy = clean, affordable, reliable

THE ROLE OF NUCLEAR ENERGY

IEA 2°C Scenario: Nuclear is Required to Provide the Largest Contribution to Global Electricity in 2050

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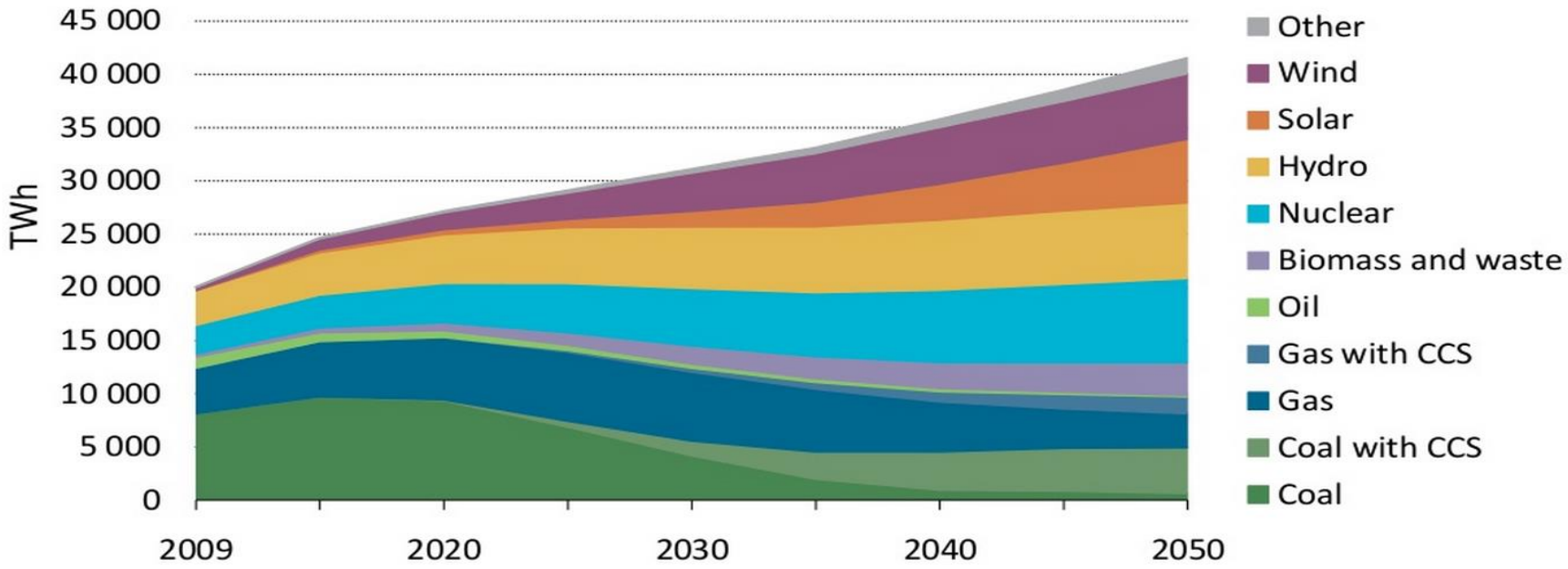
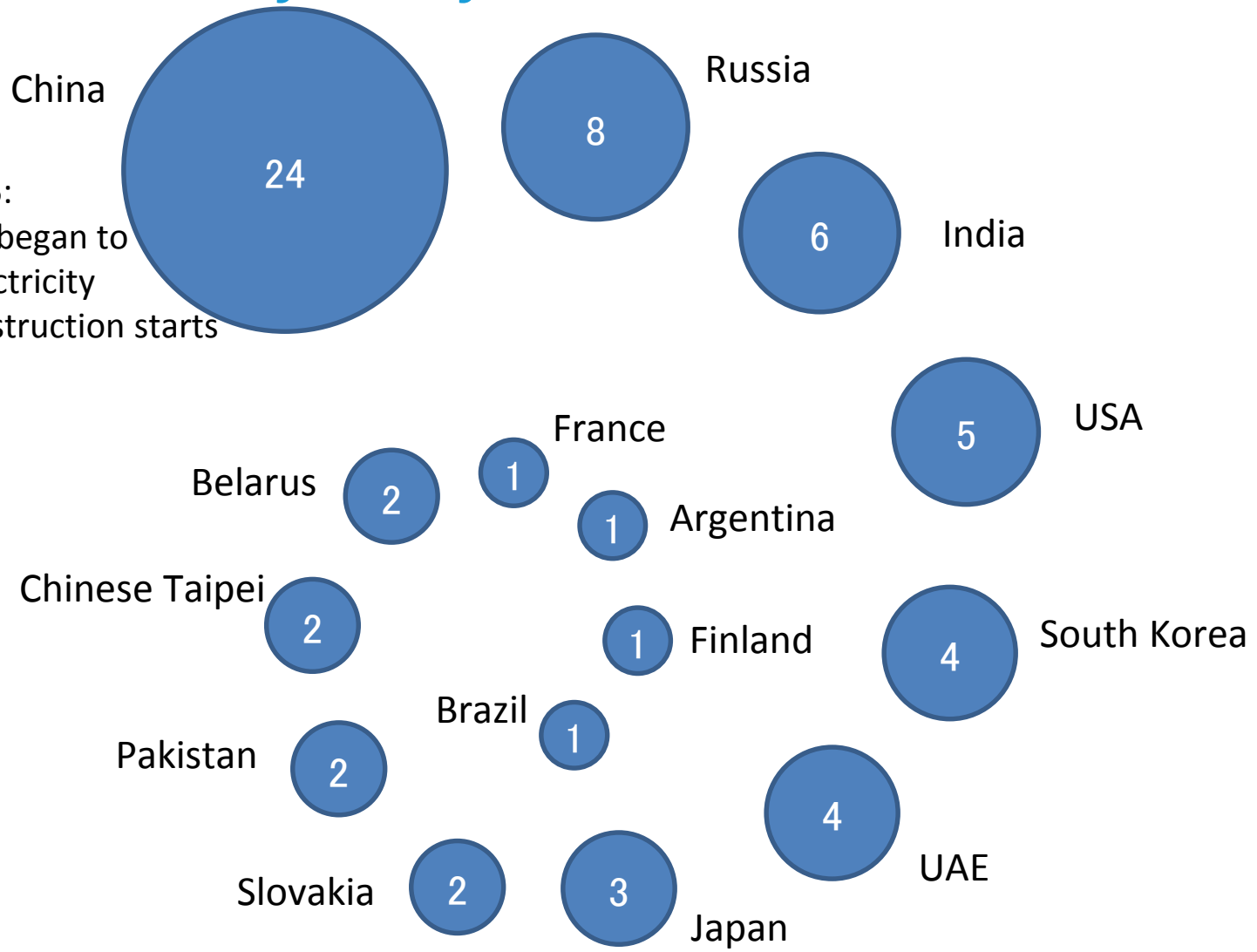


Source: International Energy Agency

Highest level of construction in twenty five years: 66 reactors worldwide

China 2015:
8 reactors began to deliver electricity
6 new construction starts



Source IAEA January 2016
A.Rising presentation

The role of nuclear: Substantial growth required to meet demand in IEA 2°C scenario

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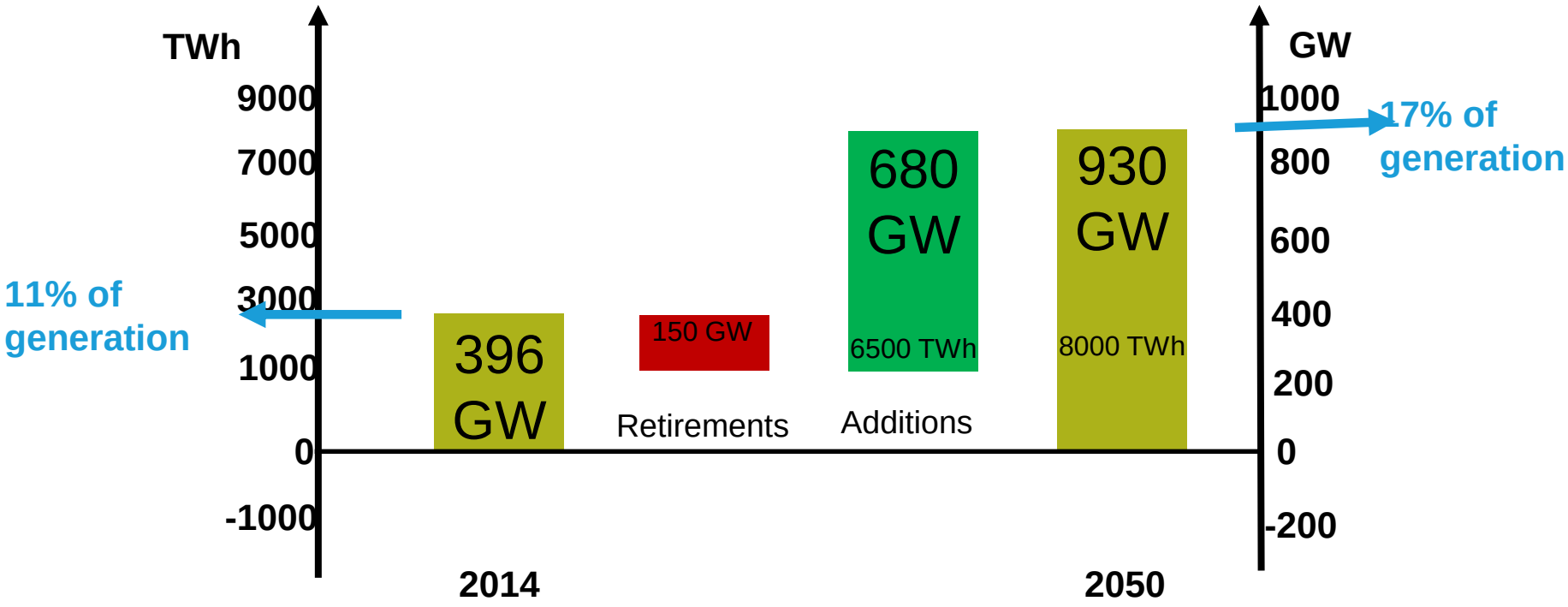

Source: IEA-NEA, 2015, Technology Roadmap: Nuclear Energy, Paris: OECD-IEA: p. 22;
IEA, 2015, Energy Technology Perspectives 2015, Paris: OECD-IEA

Increase accessibility to nuclear energy

Nuclear industry must play its role

- Keep nuclear competitive, deliver on time and to budget.
- Build confidence among its stakeholders about the reliable, affordable and clean nature of nuclear energy.

The global nuclear industry: identify barriers, engage in dialog, develop key actions

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- **Level playing field:** Establish a level playing field for **all low-carbon technologies**, valuing not only environmental qualities, but also reliability and grid system costs.
- **Harmonise regulatory processes:** enhance standardisation, harmonise and update global codes and standards.
- **Effective safety paradigm:** Ensure global nuclear safety. Confidence in management of nuclear technology and operations. Stakeholder trust. Risks in perspective.

Why Inter-regional cooperation

- With due consideration to the diversity of cultures and context, as well as to fair competition, knowledge sharing among peers contributes to the sustainable development of nuclear industry in different countries

- Intergovernmental organizations and international trade associations facilitate the share of views and leading practice. The advantage of international networking with peers is incommensurable in a globalized market

- To meet the needs of nuclear professionals within this expanding nuclear industry, the WORLD NUCLEAR UNIVERSITY can draw on its network of international organizations, academia, research centers and industry to provide a range of educational and training programmes around the world.

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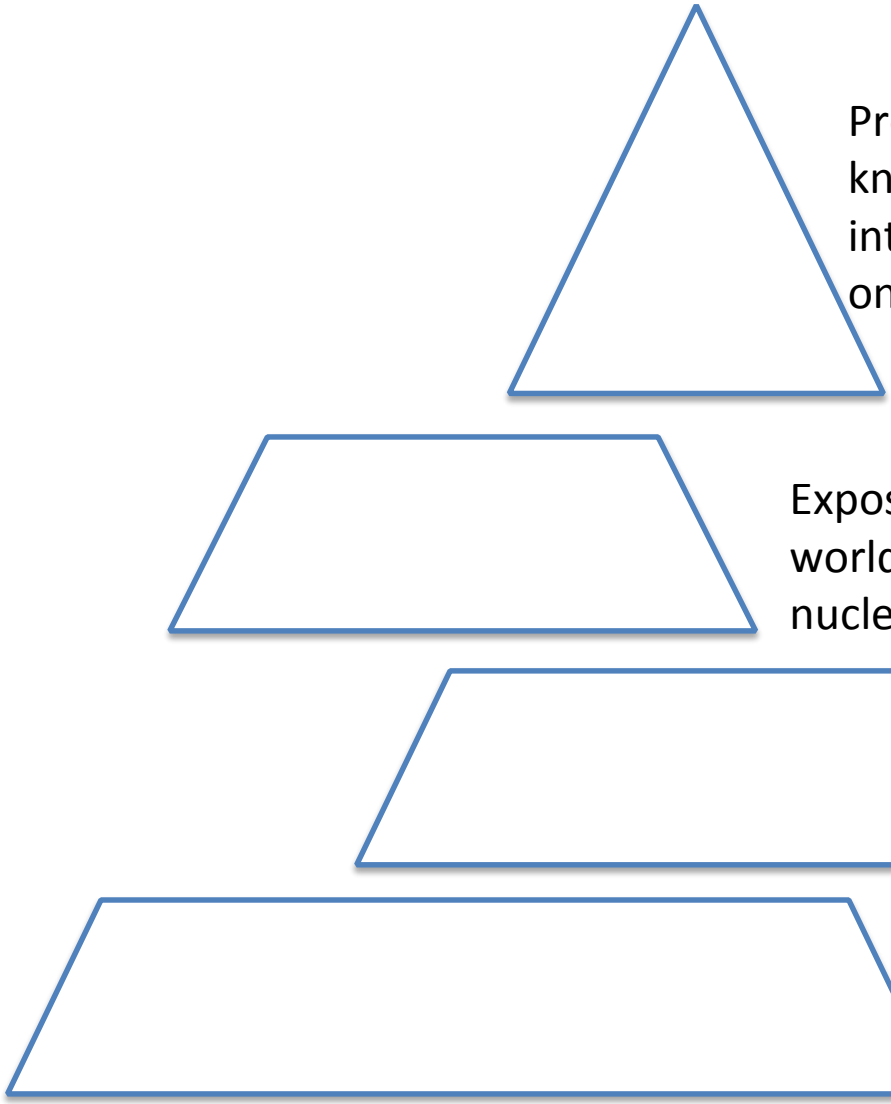
The WNU Summer Institute

How to Achieve the Objectives



Present cutting-edge knowledge and broad international perspective on nuclear topics

Expose participants to the world's leading thinkers on nuclear applications

Enable participants to experience practical teamwork with peers from many nations

Inspire participants to commit themselves to advancing nuclear science and technology

SI Curriculum

Content (270 h)

Global Setting

Nuclear Industry

Law, Safety, Security, Safeguards

Leadership, communication, project management

Methodology

20% Lectures

45 % Workshops, interactive platforms, simulations, mini forums

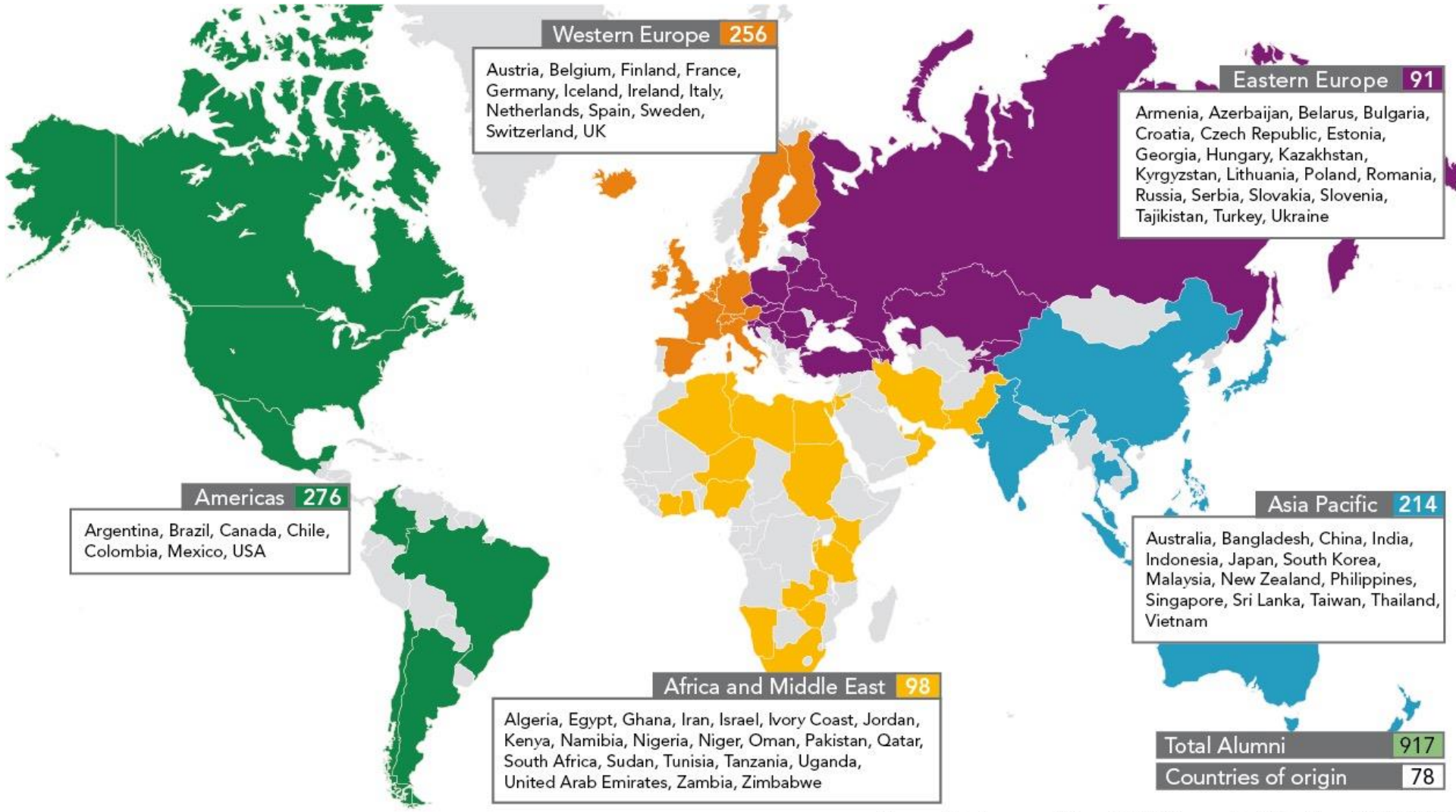
15 % Technical visits

10 % Invited leaders presentations

10% Network for Nuclear Innovations

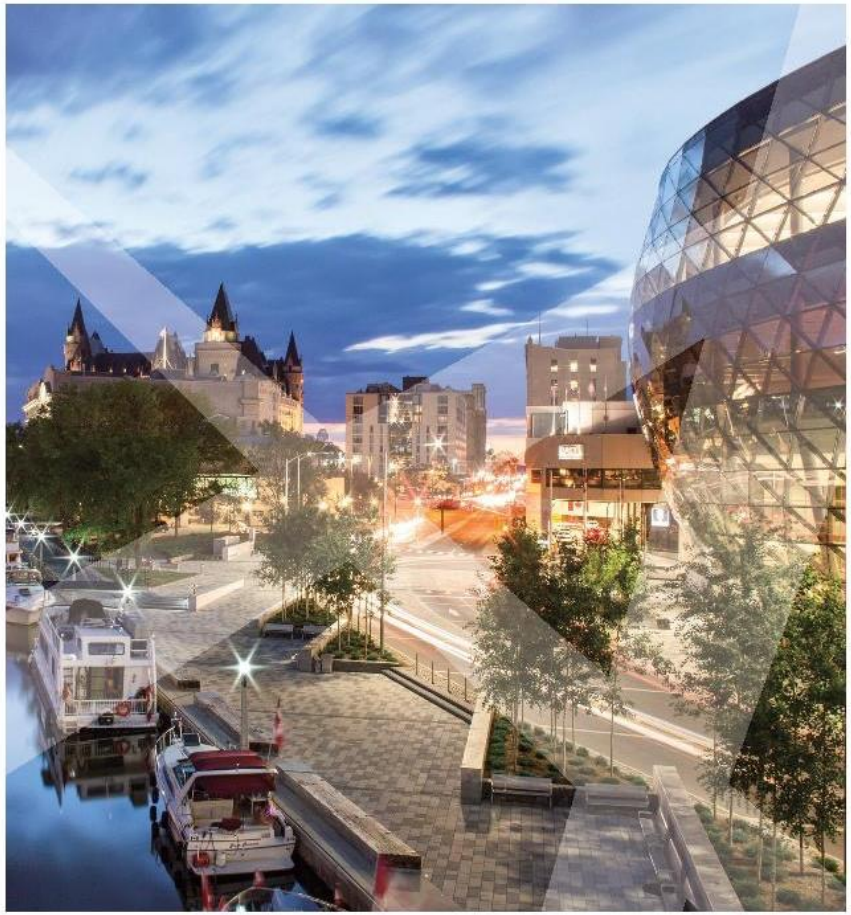
WNU SI 2015 class

The WNU SI Alumni Network



Geographical representation of WNU Summer Institute Alumni, 2005-2015

Deadline for Applications: 12 February



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SUMMER INSTITUTE 2016

28 June to 5 August - Shaw Centre, Ottawa, Canada

A unique career development programme for future world leaders in nuclear science and technology

"This was a one of a kind experience, … I grew so much by listening to the lecturers, visiting other sites and by the day to day interactions with people over the entire world."

Ariadna Clark, Exelon, Summer Institute Alumna 2015

Apply now

world-nuclear-university.org

wnu@world-nuclear-university.org

Founding supporters

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IAEA International Atomic Energy Agency

NEA NUCLEAR ENERGY AGENCY

WANO

A better future for nuclear

Patricia Wieland, Head of WNU

Take away points

- The world learned with Japan how to produce with quality and efficiency. Any solution can be found here.
- Training for emergency situations is different from classroom traditional – special skills and attitudes are required
- The world needs more clean, reliable and affordable energy, but change is needed, in terms of effective safety paradigm, level playing field and harmonized regulatory process
- In a globalized world, international network can help to prepare future leaders.

Thank You!

www.world-nuclear-university.org

Facebook: World Nuclear University

patricia.wieland@world-nuclear.org

WNU Coordination Centre
Tower House, 10 Southampton Street, London, WC2E 7HA, UK
www.world-nuclear-university.org