



INPRO Dialogue Forum on International Collaboration on Innovation to Support Globally Sustainable Nuclear Energy Systems

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CHALLENGES FOR NATIONAL NUCLEAR POWER PROGRAM OF VIETNAM – NUCLEAR ENERGY SPECIALISTS TRAINING

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Outline

- 1. Challenges for National Nuclear Power Program**
- 2. Proposal on Nuclear Energy Specialist Training (NEST)**
- 3. Concluding remarks**

1. Challenges for Nuclear Power Program of Vietnam

The IAEA has been assisting the new comer countries through Integrated Nuclear Infrastructure Reviews (INIR) to provide international expert review of infrastructure status and identifies areas for further action and makes recommendations.

The INIR Missions for Vietnam: phase 1 in 2009 and phase 2 in 2012

As a Newcomer – Country embarking on nuclear power, Vietnam is facing many challenges:

First, the shortage of human resources necessary to almost relevant aspects, such as law and regulation, management, science and technology, while capacities of Vietnam's education and training institutions are still limited;

Second, NP development from a low level of infrastructure, including legal framework, competent regulatory body, Technical Support Organization, research & development organizations;

Third, Assessment and selection of reactor technology meeting criteria put by the Government (Generation III, III+, proven, affordable to transmission grid);

Fourth, Financing and investment, including infrastructure development, work force training, resettlement,...;

Fifth, Assuring safety, security, and non-proliferation requires to become parties of some international instruments (AP, CPPNM and the Amendment, Vienna Convention, Joint Convention);

Sixth, Fukushima accident raises more public concern, requests review of nuclear safety and related issues, at the results , licensing time and construction period will be prolonged and project cost will increase, etc.; and

Seventh, implementing two projects with two partners of different technical regulations and standards on sitting, technologies,...also cause difficulties to formulation of regularity documents.

(Referred from the previous presentation at INPRO Dialogue Forum on Nuclear Energy Innovations: Common User Considerations for Small and Medium-Sized Nuclear Power Reactors, Vienna, 10-14 October 2011 by Mr. L. D. Phac, Deputy Director General Vietnam Atomic Energy Agency (VAEA

1.1 Two biggest problems

i/ Human resources development

- The Atomic Energy Law passed in 2008 in Vietnam specifies the leading role of the Government in human resource development and stipulates the responsibility of NPP operator for ensuring adequate manpower;
- Decree 07 in 2010 specifies measures to attract and sustain people to work for nuclear energy field, including providing favorable conditions for those working in the field of nuclear energy;
- Decision No 1558 on 18 August 2010, the Prime Minister approved the project “Training and Human resource development (HRD) for nuclear energy” with the budget of US\$150 million.

ii/ Regulation and legislation

- Lack of expertise in preparing safety and security regulations including regulatory guides and performing regulatory functions: review and inspection;
- Interaction between Nuclear law with other laws;
- Complicated safety regulations due to the different technologies for 2 first NPPs (Russia and Japan technologies).

1.2 Relevant tasks for the next 7-10 years

- Completion of FS (NinhThuan1 and NinhThuan2)
- Selection of nuclear technologies
- Review and assessment of FS
- Examination and review of basic designs of selected technologies (PWR, BWR, VVER)
- Supporting NPP constructions
- Establishing the regulation system
- Improving R&D infrastructure and capability
- Education and training tasks

2. Nuclear Energy Specialists Training (NEST)

2.1 Prerequisite:

About the plan for Human Resource Development (HRD) for Vietnam Nuclear Power Program

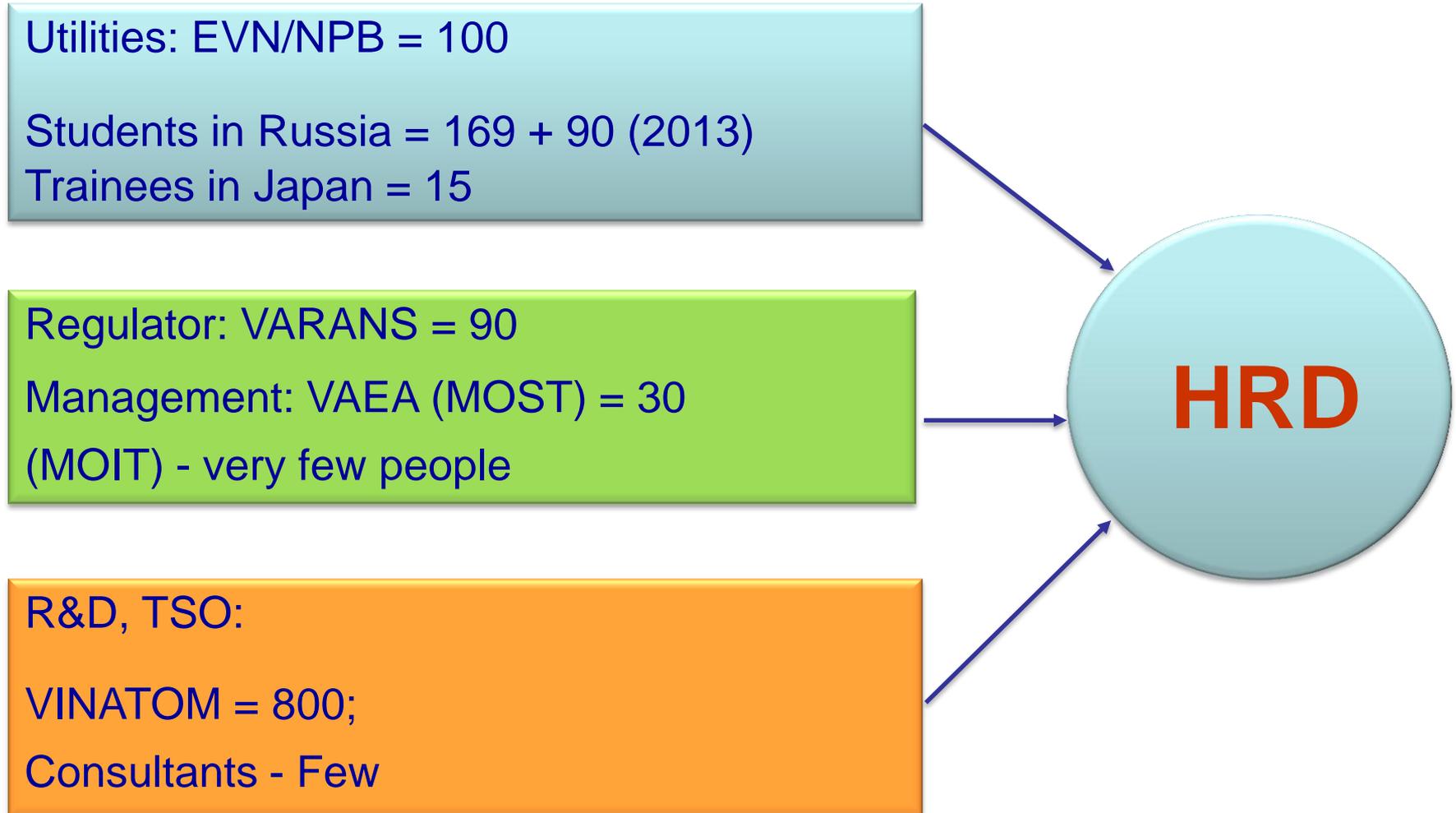
“Nuclear power requires high quality human resources, not depending on the implementing nation/country is poor or rich”

By Prof. Nam T. Dinh (North Carolina State University)

High quality human resources are key for successfully implementing the nuclear power program

2.2 Objective

Human Resources Development (HRD)



Experience in education and training

- Education system focuses on nuclear physics, nuclear technique and radiation technology
- Long term education abroad has been limited
- Training on nuclear power were mainly short courses (IAEA, Japan, Korea, other countries)
- Training has been inefficient due to:
 - *Lack of a good plan for training, lack of good trainees, courses abroad were spreading to many groups*
 - *Trainees were lack of background in nuclear power and NPPs, therefore they could not understand intricated and sophisticated problems*
 - *Lack of sufficient English*

**Vietnam needs a
good plan for start**

NEST Program

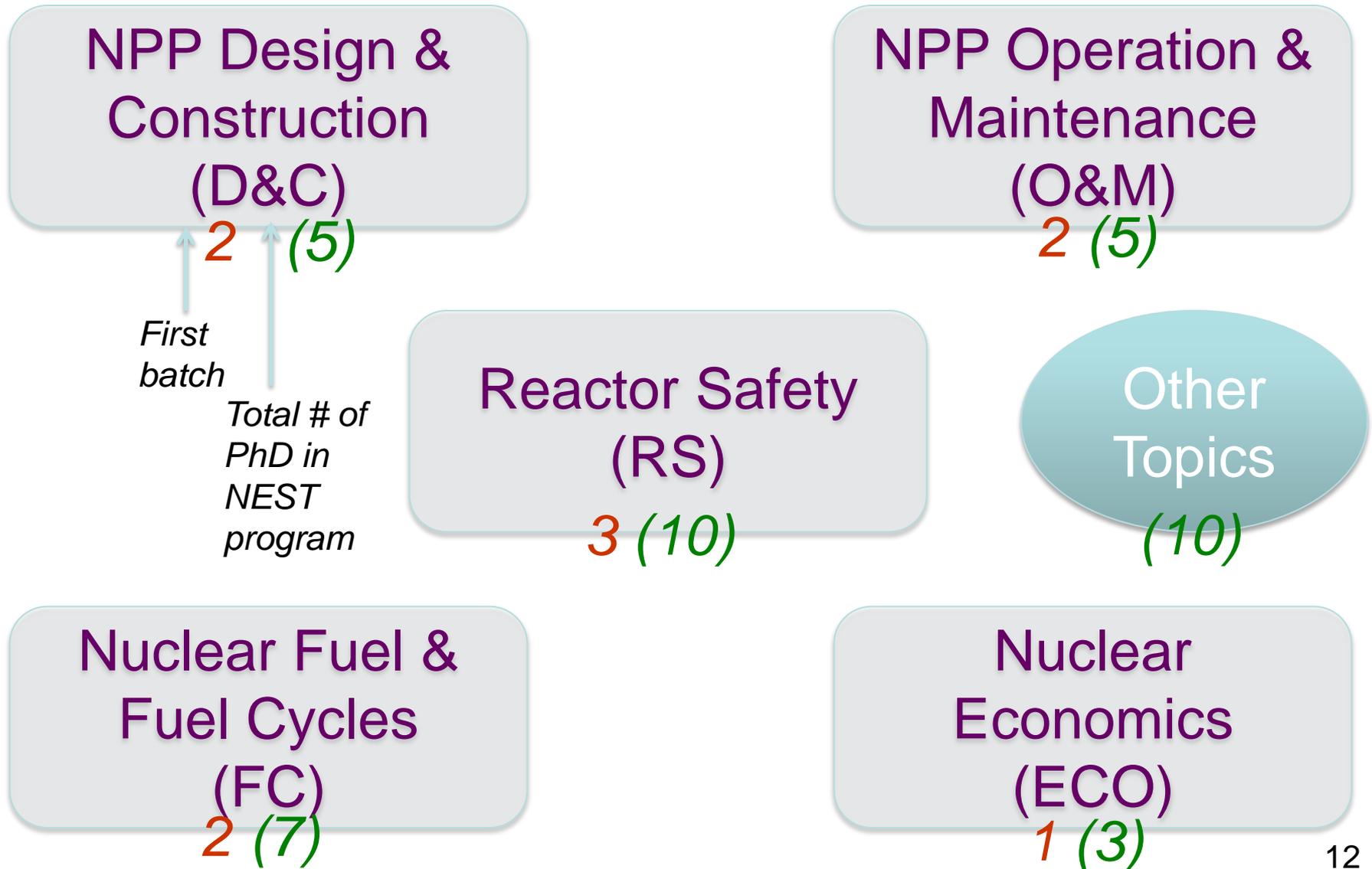
- Name: Nuclear Energy Specialists Training – NEST
- The plan is focused on training of leaders for Vietnam nuclear power program
- The plan will be submitted to the Ministry of Science and Technology (MOST) and Vietnam Government
- A special national scholarship is needed to attract the best new engineers/Masters/PhD

NEST Flowchart



* *CNEST: Center for Nuclear Energy Science and Technology*

2.3 Strategic Areas



2.4 Topics and Universities



	Issues/ Topics	University
1	NPP siting and external events; evaluation of EQ and flooding	TAMU, UNM, UCB (?)
2	NPP system engineering, quality control, inspection, testing, acceptance	(TBD – Russia, US, Europe, Japan)
3	Digital I&C system design, performance, compatibility, reliability	OSU
4	HRA: Human reliability analysis (incl. cultural factors)	UMD, OSU
5	PSA-L1: Passive safety systems evaluation	UM, TAMU, OSU
6	PSA-L2: Severe accident management	UWM, NCSU , TAMU
7	PSA-L3: Environmental impact and mitigation of a severe accident	OSU
8	Nuclear fuel & irradiated materials performance and failures	UTK, UCSB
9	Fuel cycle analysis, incl. issues in nuclear proliferation and security	UNM
10	Energy economics, including rare event consequences	UCB

TAMU: Texas A&M University

UNM: University of New Mexico

UCB: University College Birmingham

OSU: Ohio State University

UMD: University of Maryland

UTK: University of Tennessee, Knoxville

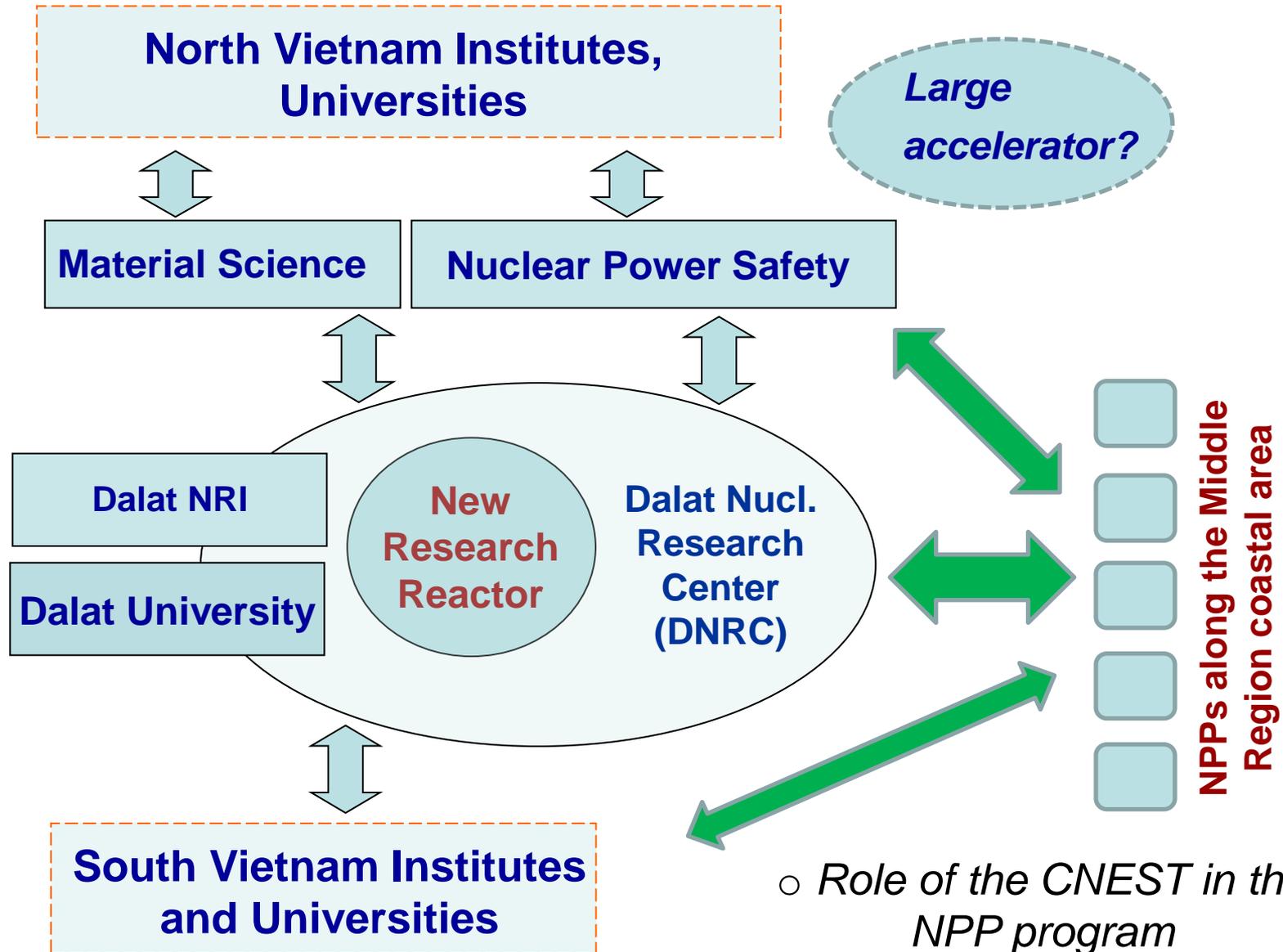
NCSU: North Carolina State University

UCSB: University of California, Santa Barbara

2.5 NEST Project Implementation

- Selecting and appointing key personnel for the project
- Establishing connection to select Foreign Institutions/Professors
 - Difference: VN-mission-driven
- Creating VINATOM Post-Graduate Training Program (PGTP)
 - Teaching base (Dalat?)
 - Selecting lecturers, mentors, advisors
- Recruiting students
 - Identifying, recruiting young talent at BSc, MSc, PhD levels
 - Negotiation/ Connection to VINATOM mentor
 - Training (PGTP)
- Meanwhile: Negotiating with foreign institutions/professors
- Sending students to foreign institutions
- Following with trainees along training and return
 - Difference: end-product-oriented!
 - Working with VINATOM group/lab on VN (defined) issue

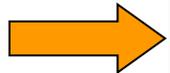
Research Environment



○ Role of the CNEST in the NPP program

3. Concluding Remarks

- ✓ The National Nuclear Power Program of Vietnam is facing many challenges, in which requirements on human resource development and regulation are two biggest ones;
- ✓ We have presented a plan for training experts (specialists) needed for Vietnam nuclear power program;
- ✓ The plan is suggested to be implemented under VINATOM / MOST involving effectively experts and using research infrastructure of VINATOM;
- ✓ Creation of good research environment for the trainees to work after study/training abroad is necessary (Center for Nuclear Science and Technology – CNEST project);
- ✓ We hope Vietnam Government will support and start this NEST early.



The NPPs program of Vietnam needs to attract the well-trained people, otherwise it will not be successful

***Thanks for
Your Attention !***