



SUMMER INSTITUTE  
2017

# NETWORK FOR NUCLEAR INNOVATION





# The WNU Summer Institute

The World Nuclear University (WNU) Summer Institute (SI) is a nuclear training and leadership development programme which has been running since 2005. Each year the WNU SI trains around 70 professionals, from more than 30 countries, selected by their organisations for their leadership potential. The WNU Summer Institute now has 1071 alumni from 83 countries.

Over six weeks, the programme covers the full spectrum of topics surrounding nuclear energy necessary for nuclear leaders, as well as essential leadership skills. The WNU applies modern teaching techniques best suited to active professionals, using working group projects, simulations, case studies and interactive platforms. The Summer Institute curriculum covers the following areas:

- Global setting, including energy supply and demand, climate change, nuclear technology in sustainable development, new build and key political issues and trends;
- Nuclear industry and applications, including the nuclear fuel cycle, production of nuclear energy, operational excellence, technology innovations, transport, waste management, economics, and a brief summary of the newest applications of ionizing radiation;
- International regimes, nuclear law and 3S, including the international legal framework, safety, security and safeguards, implementation aspects and oversights;
- Leadership, project management, knowledge management, and effective communications.

The WNU Summer Institute comes to a conclusion with the Network for Nuclear Innovation (NNI), the final group projects. The aim of the Network for Nuclear Innovations is to enable fellows to participate in detailed discussion on important global nuclear issues and bring new ideas to the table. Each topic is guided by a mentor who has notable experience in this field and the group produce a product which can then be further developed in their network after the Summer Institute ends. NNIs' outputs take the form of reports, published articles, communication strategies, open letters, for example.

For more information, please visit:  
[www.world-nuclear-university.org](http://www.world-nuclear-university.org)

or contact us:

facebook

twitter

instagram

Email | [wnu@world-nuclear-university.org](mailto:wnu@world-nuclear-university.org)

# Introduction

The aim of the WNU Network for Nuclear Innovation is for a team of fellows to intensively investigate important global nuclear issues and bring new and fresh ideas to them. This module takes place in the last two weeks of the WNU Summer Institute with group work on the project and a final presentation of their innovative approach to their issue. Each topic is guided by a mentor, while the fellows take the lead on the projects.

Each group creates a final output of high quality that can take numerous forms. As examples, this could be an article to be sent to publication, a paper to be presented in an International Conference, a video to be posted, well founded recommendations for nuclear research, an open letter to leaders, and an educational campaign.

As the project is inhaled, each group presents and answers question about their project plan. This makes the opportunity to further enhance their work based on the suggestions provided by the other Summer Institute groups.

It is important that the multicultural teams of fellows approach the task motivated to learn and prepared to bring ideas and experience to the table. Persistence, enthusiasm and hard works are key.

Time management is a crucial part of the NNI as the hours fly by very quickly, and the fellows have all others Summer Institute activities in parallel.

In 2017, there were 8 Network for Nuclear Innovations tackling a variety of relevant issues. This publication presents the abstract of their work. More information can be obtained at [wnu@world-nuclear-university.org](mailto:wnu@world-nuclear-university.org).

The WNU also encourages each Network for Nuclear Innovation to continue to be interested in the topic selected, even after this Summer Institute. Fellows are connected to a LinkedIn page for the WNU SI alumni to share their ideas and continue conversations.

# Contents

NNI 1   The possible solutions for the technical and economic challenges of the integration of nuclear and renewables in low carbon grid	1
NNI 2   The 4Rs – reduction, reuse, recycling and recovery – A case study in the nuclear industry	3
NNI 3   Sustainability factors in energy system	5
NNI 4   Nuclear safety regulators effectiveness	8
NNI 5   Contributing to the Harmony programme	10
NNI 6   Leadership and employee development	12
NNI 7   Feasibility study for new nuclear power project	14
NNI 8   Global communications in the 21 <sup>st</sup> century	16





## NNI 1 - The possible solutions for the technical and economic challenges of the integration of nuclear and renewables in low carbon grid

Renewable energy will be the greatest source of generation in a future low-carbon electricity grid. Integrating renewables to achieve low-carbon energy mixes will be required to meet the Nuclear Industry's Harmony goals. Assuming these goals are met, the world temperature increase as a result of anthropogenic climate change will remain less than 2 degrees Celsius. The project goals include increasing the supply of nuclear power by 1,000 GW – representing 25% of the global energy mix. With a large reliance on renewables, extremely sunny or windy days may result in oversupply of electricity to the grid, making nuclear power uneconomical. However, a strong nuclear baseload provides essential supply when the weather or seasons are less-favourable. This plan proposes a method for integration of nuclear energy and renewables in a low-carbon grid.

In order to predict the realistic cost of implementing the "ideal" energy mix, the NNI 1 developed a model, using OECD data, the levelized cost of electricity (LCOE) was projected. After calculating the LCOE for various scenarios, the ideal mix scenario was analysed to provide insight on the subsidies that would be required to enable this ideal mix scenario.

The model was applied to Indonesia and the United States in a case study. Both are large countries with an extensive natural resource of low cost thermal coal. The model analysis showed that nuclear and renewables can successfully be applied to reduce carbon emissions from the electricity grid by 80% by 2050. The cost of subsidies to society was found to be comparable to the current level. A carbon tax and storage are required for nuclear to be economical.

## Problem Definition

To recommend a method to combine nuclear and renewables in a reliable low-carbon grid at minimum cost to society.

## Why should we care?

- Disruption of Electricity
- Climate Change
- Threats to Nuclear Market

## Proposed Solution

To demonstrate the viability of a low-carbon nuclear and renewable mix, NNI 1 developed an ideal energy mix which can be applied to any energy market. Supporting the ideal mix, a model was developed which allows the user to provide inputs and provides insight on the policy tools that should be applied to the energy sector in order to achieve the energy mix.

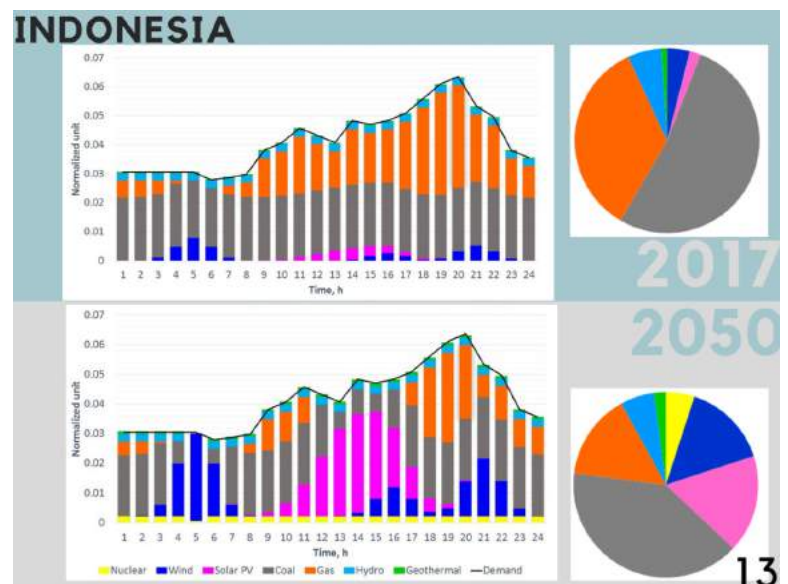
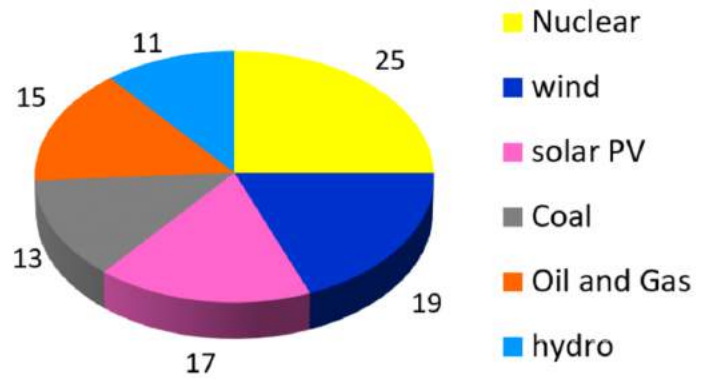
## Case Studies

The model was applied to two countries as a case study. The countries are Indonesia and the United States. These two differ in important ways: demand for energy is growing rapidly in Indonesia and nearly steady in the US. The United States has the world's largest operating fleet of nuclear power plants while Indonesia is set to be a newcomer to the nuclear industry. On the other hand both have a large population and their future energy mixes are constrained by the need for decarbonisation.

## Conclusion

The focus of the report was to recommend a method to combine nuclear and renewables in a reliable low carbon grid at minimum cost to society. The characteristics of nuclear and renewables were examined, including their potential incompatibility in a grid with high levels of renewables. Policy tools to stimulate development and deployment of renewables were introduced. Energy storage options were evaluated including electrical, mechanical and heat storage. Battery technology is well-established and heat storage was found to have potential wide applications but requires further development to make them economically viable.

2050 energy mix [%]



## NNI 2 | Multinational repository: a collaborative approach to used fuel management

Countries, such as the United Arab Emirates, which are currently developing their nuclear power programme, must consider a number of aspects such as sustainability, environmental stewardship, security, non-proliferation, economics and nuclear fuel cycles, as they are developing their nuclear framework. Regardless of which fuel cycle option these emerging countries choose (i.e., reprocess spent fuel or dispose of spent fuel), they will have high-level waste to manage.

From an economic, security and non-proliferation perspective, the concept of a multinational repository is considered to be an ideal solution for emerging countries. However, development of a multinational repository has been investigated for decades, with limited or no success. This position paper draws on the lessons learned from past initiatives and proposes the creation of a new entity – Emerging Nuclear Countries Repository Initiative (ENCRI). This initiative addresses the barriers and limiting factors identified based on three different disposal mechanisms: co-operation between small nuclear countries, volunteer non-nuclear power repository host country and fuel leasing. The main distinction of ENCRI is that it brings together, representatives from volunteer host countries, emergent nuclear countries, nuclear reactor technology suppliers, and discusses a win-win-win situation for each one of the three groups. The framework for ENCRI and a high-level business plan are also summarized.

## Background

Everyday human needs, quality of life and technological progress are strongly dependent on reliable and affordable energy. Nuclear, along with other renewable energies, needs to play a key role in meeting future global energy needs and decreasing GHG emissions.

Whether the country's nuclear strategy involves an open fuel cycle (i.e., used fuel will be stored in interim storage facilities until a final deep geological repository is available) or a closed fuel cycle (i.e., the country will recycle, reuse and recover fuel), a repository for the used fuel or for the reprocessing waste stockpiles will be required for long-term disposal.

Over thirty countries currently operate nuclear power plants in the world; approximately half of those have fewer than five reactors, and their nuclear power programs are relatively small.

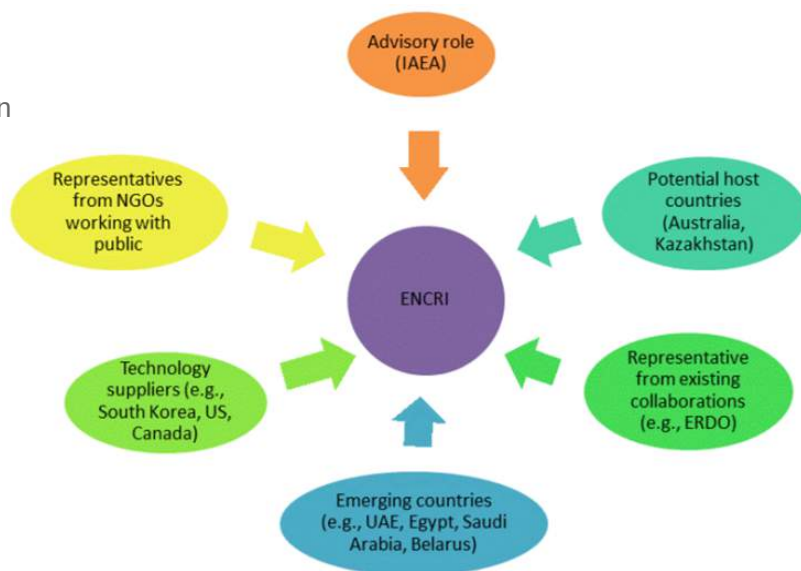
Many of the current nuclear countries have plans to develop disposal facilities for intermediate and high level waste facilities. Therefore, a need has been identified for a multinational repository design.

## Proposal

The creation of a new entity called ENCRI (Emerging Nuclear Countries Repository Initiative) is proposed in order to promote, develop and implement a multinational repository for emerging nuclear countries such as UAE or Egypt.

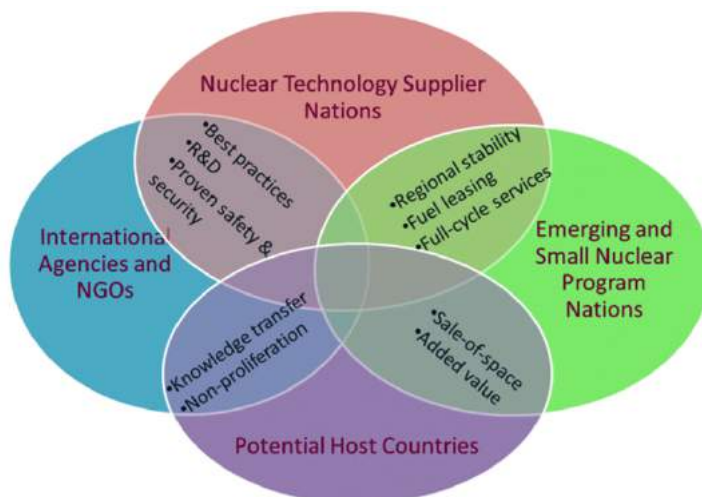
Indeed, we strongly think that such a three-party scheme, by bringing together the needs and opportunities of each member, can create a "virtuous circle" and lead to the actual implementation of a multinational repository.

ENCRI would also include representatives from existing collaboration groups such as ERDO (European Repository Development Organization) and from NGOs working with the public. The IAEA would have an advisory role.



## Expected Benefits

- Emerging countries could find actual partners with a strong commitment to the project and start working on the implementation of a multinational repository solution.
- The process of implementing a multinational repository could be made easier.
- Real potential to help to solve the public acceptance issue by constructing a communication plan that includes the point of view of all parties.







## NNI 3 | Sustainability factors in energy systems

After reading a wide range of articles on the subject, we noticed that sustainability of energy systems is not often discussed in a rational, balanced and transparent fashion. In addition, nuclear power is often left entirely out of discussions of sustainable energy systems. Moreover, engagement of the non-nuclear community is problematically low.

Sustainability is a broadly used term in current society. The definitions range from merely an ecological aspect to trifled requirement for social, economic and environmental considerations. In order to avoid unnecessary restriction, we view sustainability through a range of factors:

- Environmental (Sub-factors: climate change, resource use, land use, acidification, ecotoxicity, human toxicity/smog, waste heat and ionizing radiation)
- Economic (Sub-factors: capital costs, operating costs, post-operation costs and externalities)
- Social (Sub-factors: economic growth, energy security, well-being of people/society, forced displacement/ resettlement, political system and ethics)
- Technical (Sub-factors: balance of supply/demand and energy return on energy invested)

Energy sources are categorized by energy organizations worldwide as renewable or non-renewable. Renewable energy sources are derived from natural processes which are replenished as they are consumed and include solar, wind, geothermal, hydro power, bio energy and ocean power. Non-renewable energy sources are not replenished in human lifetime(s) and reserves are depleted as they are consumed. These include fossil fuels (coal, crude oil, natural gas) and uranium. Each energy source needs some special consideration against the factors of environmental, economic, social and technical; these results are shown in the table of energy sources and sustainability factors.

To assess the future needs of energy, the current trends in worldwide energy use are explored. Energy consumption in OECD countries has stabilized around the year 2000 level; meanwhile, consumption in developing countries has continued to increase. It is expected that ~90% of energy consumption will need to be electrical in order to restrict GHG emission. Furthermore, world population is projected to reach 9.3 – 10.2 billion by 2050. Consequently, non-GHG emitting energy production must be increased dramatically to sustainably meet energy demand.

Through a case study of the German energy mix scenario up to 2050, an enormous energy gap (700-1000 TWh / year) between the reality and the (optimistic) forecasts have been found in all the “renewable energy 2050 scenarios”. To achieve the German environmental target in 2050, we suggest nuclear energy as a part of sustainable energy mix in Germany. To consider nuclear energy as sustainable, we are faced with several challenges to be solved: investment costs, radioactive waste and risk of nuclear energy.

## Societal Energy Needs

- Energy demand per capita across the world is assumed stabilize at current OECD levels; OECD consumption stabilized around the year 2000
- In order to restrict GHG emissions, it is expected that ~90% of energy consumption will be low carbon
- World population is projected to reach 9.3 – 10.2 billion by 2050
- Non-GHG emitting energy production must be increased dramatically to sustainably meet energy demand

## Case Study: Germany

- Expected Future Demand

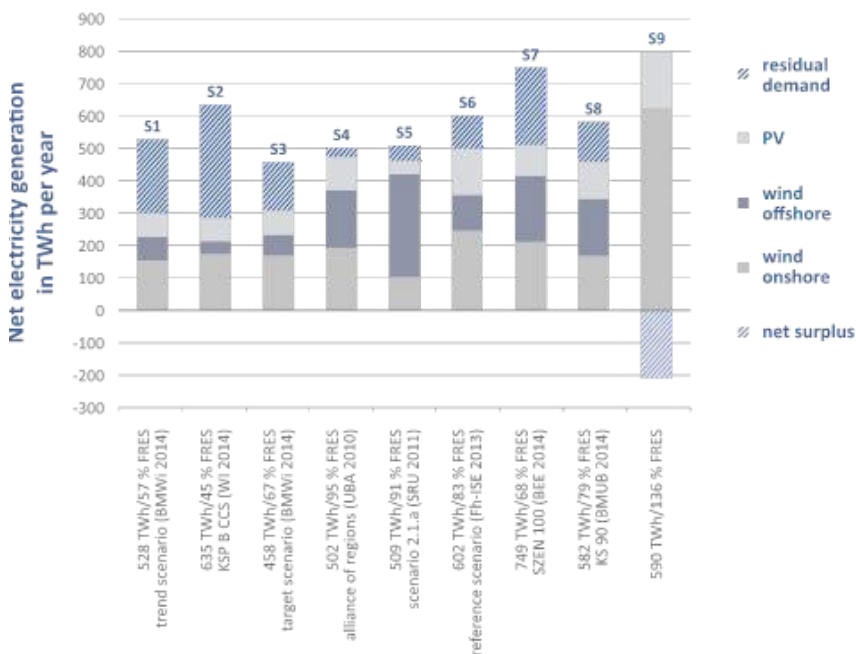
German population: 79 million

Required energy production per year :

- Total: 60 kWh / capita - day
- Electrical: 55 kWh / capita – day  
⇒ 33% reduction in overall use, obtained by electrification

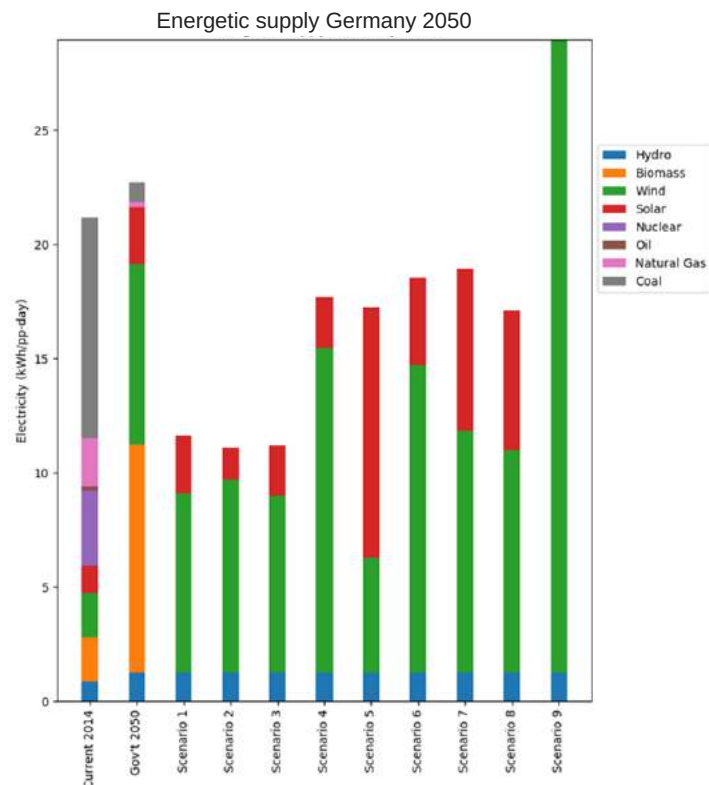
- Scenarios for 2050

Various proposed scenarios of electrical generation mix were considered, including some which are very optimistic.



	Heavy Oil	Coal	Coal CCS	Gas	Gas CCS	Wind	Solar PV	Solar Thermal	Hydro	Nuclear	Biomass	Geothermal	Waste	Ocean
<b>Parameter</b>	<b>Special Consideration Required</b> (x - asterisk indicates significant uncertainty, e.g. dependence on society / technology)													
<b>Environmental</b>														
1.1 Climate Change	X	X		X										
1.2 Abiotic Depletion	X	X	X	X	X	X*	X*	X*		X				
1.3 Land Use	X	X	X	X	X	X	X*	X*	X		X			X
1.4 Acidification (precipitation)	X*	X*		X*										
1.5 Eutrophication									X		X			
1.6 Ecotoxicity	X	X	X	X	X	X	X		X*	X			X	
1.7 Human Toxicity / Smog	X	X	X	X	X						X		X	
1.8 Waste Heat	X	X	X	X	X			X		X	X	X	X	
1.9 Ionizing Radiation										X				
<b>Financial</b>														
2.1 Capital Costs			X		X	X*	X	X	X	X		X*		X
2.2 Operating Costs	X	X	X	X	X						X		X	X*
2.3 Post-Operation Costs		X*	X*				X*	X*	X*					X*
2.4 Externalities	X	X		X		X*	X*		X	X			X	X*
<b>Technical</b>														
4.1 Balancing Supply and Demand						X	X	X						X
4.2 EROEI						X	X	X			X*			X
<b>Social</b>														
3.1 Economic Growth						X	X	X						X
3.2 Energy Security	X	X	X	X	X					X*				X
3.3 Wellbeing of People/Society	X	X		X		X		X		X*				
3.4 Forced Displacement and Resettlement	X	X	X	X	X				X	X*				X
3.5 Political System	X	X	X	X	X				X	X				
3.6 Ethics	X	X	X	X	X	X			X	X	X		X	

Table: Energy sources and sustainability factors



- Reality

Even the most optimistic electrical generation mix proposed falls far short of the anticipated requirements.

- Options to Bridge the Gap

- Size of the gap (700-1000 TWh / year for Scenarios 1-8)
- Biomass insufficient (generously 200 – 400 TWh / year)
- Gas without CCS – inconsistent with climate targets
- Gas with CCS – industrial challenges, expensive
- low energy security, Solar in deserts ("Desertec" : very low energy security)
- Nuclear – not perfect, but capable of meeting necessary challenges

## Conclusions

Sustainability of Nuclear Energy has some challenges:

1. Investment costs

- Europe vs. Asia
- Simpler designs, passive safety systems
- Standardization
- Replication of reactors at multi-unit sites
- Larger unit capacities vs. small modular reactors

2. Radioactive Waste

- Public Perception
- Information availability
- Technical solutions through the political and regulatory frameworks

3. Risk of Nuclear Energy

- Public Mental Models: Nuclear weapons / TMI, Chernobyl, Fukushima
- Information communicated: 17000 commercial reactor years / Learning industry / Talking to people – share rather than tell
- Reintroduce nuclear into the discussion

The goal of our group is to publish the report in a journal about sustainability:

- Expand case studies
- Compare scenarios for countries
- Edit (extensively)
- Somalia (no nuclear case – societal challenges)
- Canada (abundant hydro and other natural resources)
- Saudi Arabia (major shift required)
- China (strong nuclear programme)

Energetic supply Germany 2050

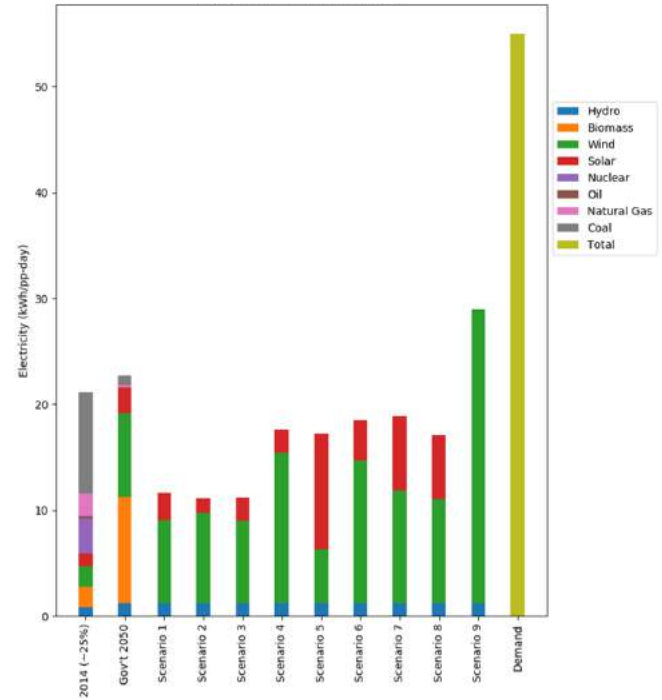
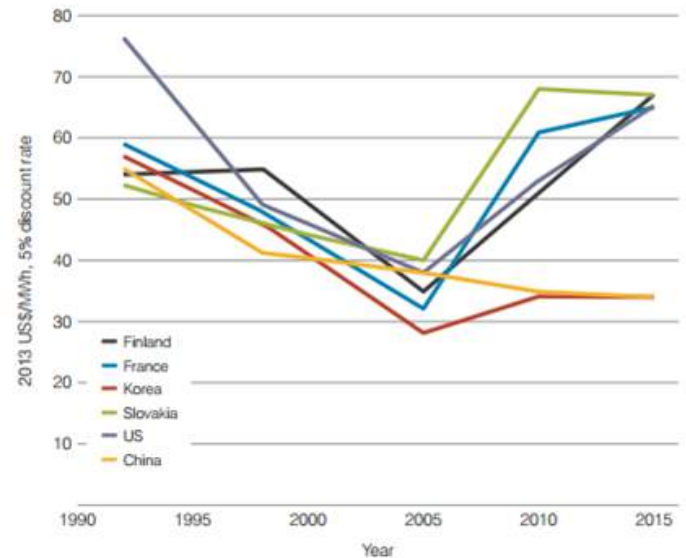
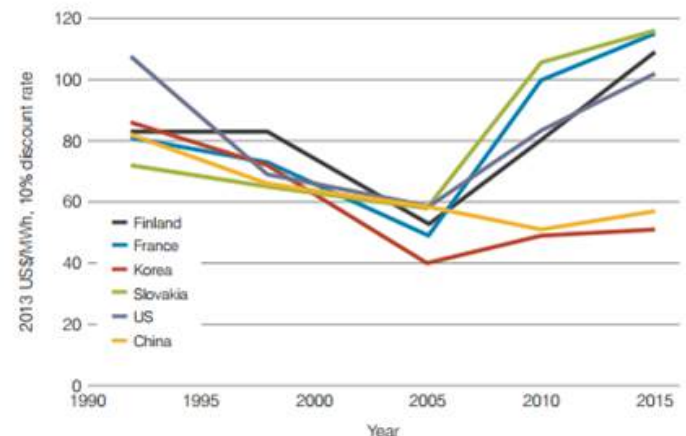


Figure 6: Historical Nuclear LCOEs (2013 US\$/MWh, 5% discount rate)



Source: IEA/NEA Projected Costs of Generating Electricity 2015 edition

Figure 7: Historical Nuclear LCOEs (2013 US\$/MWh, 10% discount rate)



Source: IEA/NEA Projected Costs of Generating Electricity 2015 edition

## NNI 4 | Providing international design review efficiency

An expert body, the International Design Review Assessment Board (IDRAB), is proposed to be formed for performing design assessments of new nuclear facility designs. Its assessment report could be accepted as an important first step in the national licensing processes.

The examples of the Non-Proliferation Treaty and the already existing international cooperation framework such as Multinational Design Evaluation Programme (MDEP) and International Atomic Energy Agency (IAEA) shows it could be possible to form an agreement with the IAEA Member States to facilitate the IDRAB mandate.

The main challenges of ensuring effectiveness within the IDRAB is to find a common baseline of requirements for the assessment of design as well as making sure IDRAB is formed in such a way that it ensures the needed trust between IDRAB and the national regulatory bodies.

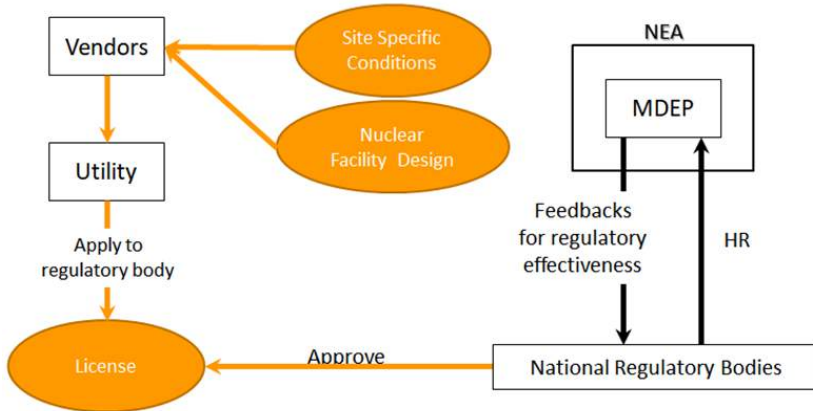
The benefits of an international agreement like the one proposed is that the overall regulatory effectiveness will increase since designs only need to be assessed once for a large number of national regulators and that the implementations of safety lessons learned as well as the sharing of up to date technical know-how will be enhanced. It is also a beneficial solution for all other parties of the industry.



## Objectives

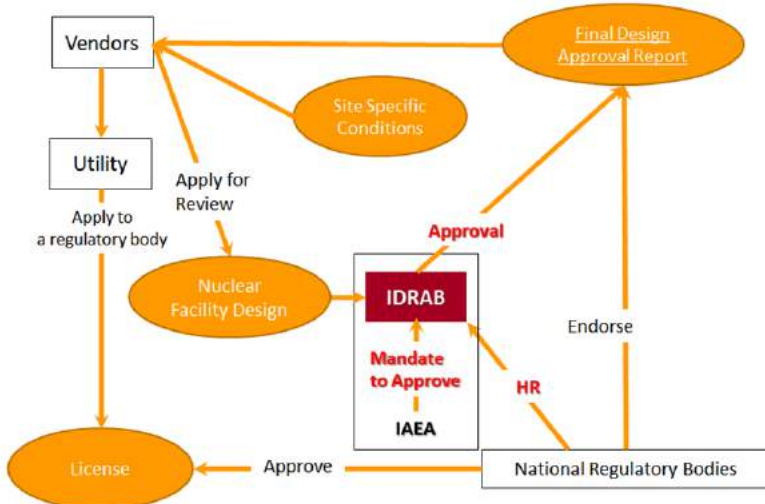
- To analyze the current situation and challenges which the national regulatory bodies face from the perspective of efficiency
- To propose the ideal international regulatory organization named IDRAB (International Design Review Approval Board) in order to improve international regulatory efficiency
- To assess the challenges to reach optimum solution

## Current Process and Challenges



From a design review perspective, regulatory bodies from different countries have to review the same design, unnecessarily duplicating effects. Expecting number of new design in the coming years, it would be repetition of review process in every country that would consume time. Besides, not all nuclear regulator have such expertise to review new designs on their own.

## Suggested



The Integrated Design Review Board (IDRAB) enhances the functions of the MDEP to spread its effectiveness to all over the world. IDRAB will perform the review of the design of new nuclear based on IAEA and other internationally accepted set of standards and requirements. This set of standards and requirements needs to be internationally recognized.

## Benefits

- Increase the efficiency of the licensing process
- Help for developing or small countries with a nuclear programme
- Increase expertise of the national regulators
- IDRAB can give advice and recommendations on design basis topics
- International consensus on the design basis of nuclear facilities

## NNI 5 | Contributing to the Harmony Programme

NNI5 was tasked with contributing to the Nuclear industry's Harmony Programme. The group's in-depth discussion led to two key observations that guided our work:

1. The three barriers to growth identified in Harmony are linked to underlying issues with public perception of nuclear energy and public understanding of the scale of the challenges we face as a global society.
2. Some of the words used in the programme – such as harmonisation and paradigm – do not translate well out of English.

The group decided that its efforts would be best spent in producing a public engagement piece to run alongside the existing Harmony programme. It was decided that this should take the form of an interactive online survey. The "Energy Mix Survey" has been designed to indirectly contribute to the Harmony goals, and in particular the identified need for a Level Playing Field. The survey is not demonstrably pro-nuclear. Instead, it is fact-based, and focused on improving respondents' basic knowledge, educating about the size of the problems we face – most notably climate change – and the possible solutions available to us. Each question has a number of options, which are linked to simple-to-understand "fact-sheets" tailored to the answer provided. The survey is translated into four languages – Chinese, French, Korean and Russian – to maximise its reach.

## Project Plan

- Create an interactive survey with linked fact sheets to each answer selected
- Presented as an objective, fact based examination of the future of the energy industry
- Better promote the goals of the Harmony Programme outside of the industry
- Target audience: the public and the “person on the street” – in simple to understand language

## Rationale

- We are interested in all energy solutions to fighting climate change/air pollution and improving accessibility to energy
- We believe that nuclear is a key part of that solution
- We believe the Harmony Programme clearly identifies the problems, but does not (as of yet) provide solutions
- We believe workable solutions are not present because:
  1. All three barriers to growth (level playing field, harmonized regulatory processes, effective safety paradigm) are the result of issues with public perception and understanding
  2. Limited progress can be made without addressing the underlying reason for the barriers existence
  3. We must find out what is the most important concern for the average “person on the street” / general public

## Output: Energy Mix Survey

- The International Energy Agency believes that by 2040, if we are to limit the rise in global temperature to 2°C and try to avoid the worst consequences of climate change, we need  $\frac{3}{4}$  of global electricity to come from low-carbon sources.
- This survey outlines, in clear and simple language, the scale of the challenge ahead of us, and the complexity of the problems that must be solved.

Welcome to the Energy Mix Survey!

EXAMPLE: We all need electricity in our modern lives. What is your main concern when thinking about your electricity supply?

1. Cost    2. Reliability    3. Climate

Choose your favorite answer by clicking on it!

[energymixsurvey.blogspot.co.uk](http://energymixsurvey.blogspot.co.uk)

Get access to this survey at: [energymixsurvey.blogspot.co.uk](http://energymixsurvey.blogspot.co.uk)  
Available in: [English](#), [French](#), [Korean](#) and [Chinese](#)

# Energy Mix Survey

## NNI 6 | Leadership and employee development

Our industry is going through change, on a global scale. While some nations are forging ahead with new build programmes, some have decided to scale back or even halt their dependence on nuclear power as part of their energy mix.

This evolving context arises from the political landscape and/or business environment in which it is operating.

Furthermore, a trend towards globalisation in the nuclear field is becoming increasingly more common.

A more critical change in the global industry is that of the needs and expectations of its workforce. The motivations of the next generation are different. The industry needs to adapt to ensure it develops its people to remain effective.

The NNI 6 therefore decided to write an open letter to industry leaders. The aim of this letter is relatively simple. We, as representatives of the World Nuclear University Summer Institute 2017 Fellows and the inheritors of your industry, have researched to identify and prioritised areas for improvement. They are:

- Career Development;
- Ability to Network;
- Ability to Delegate;
- Communication;
- Self-Confidence.

We offer the following feedback and tools for you to encourage discussion and direction. A platform to establish mutual ownership and a framework to engage and motivate Developing Leaders as they are partnered with Senior Leaders. We hope that you can hear our voice and recognise the positive influence that Developing Leaders can have in our industry.





## Challenge

Our industry is going through change, on a global scale:

- Growing: New builds and new emerging nuclear countries
- Shrinking: Phasing out nuclear and reducing nuclear generation
- Globalisation: Cultural diversity
- Ageing Industry: Gap in workforce
- Uncertainty: Political Influence on nuclear policy
- Next Generation: Different expectation from 25 years ago

## Objective

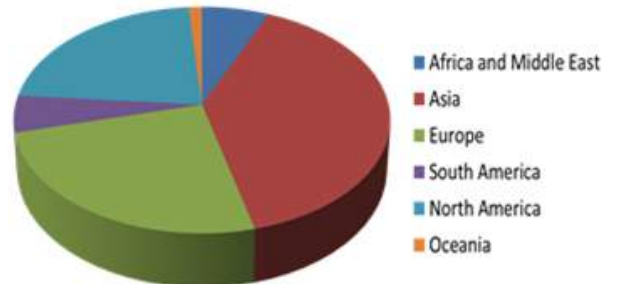
To identify development areas for future leaders to maintain a motivated and resilient workforce in a changing nuclear industry.

## Methodology

- Identification of Areas for Improvement (WNU SI 2017 Fellows through survey)
- Analysis of survey results and identification of priority areas
- Interviews with current industry leaders
- Research priority areas and identification of tools
- Development of 'Open Letter' to industry leaders
- Distribution via: Fellows and Social Media
- Creation of a dedicated Facebook page



## Interviews with current industry leaders



76 Fellows from 30 Countries

51 responded

## Output

The image shows a LinkedIn profile for 'WNU Summer Institute Alumni' with 201 members. Below it is a screenshot of a Facebook group page titled 'Nuclear Leadership for the Future Generation'. The Facebook page includes a header with the group name, a search bar, and a large banner image of a group of people. The page also shows a 'Join Facebook group' button and a 'Start a conversation with your group' button.



## NNI 7 | Feasibility study for new nuclear power project

Even though a feasibility study finished successfully, in some cases the country conducting the study could not start their nuclear programme. Other countries who were successful in completing a feasibility study and who started building nuclear plants have experienced severe delays. Evaluating the lessons learned from previous projects is instrumental in determining the cause and corrective actions that should be implemented in future feasibility studies.

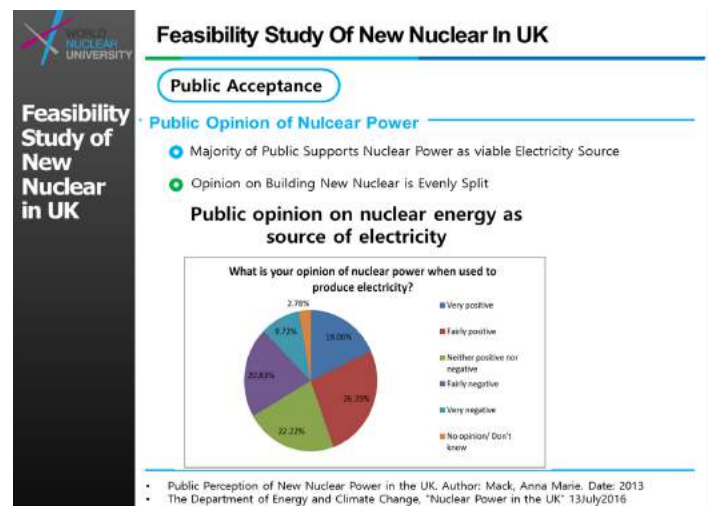
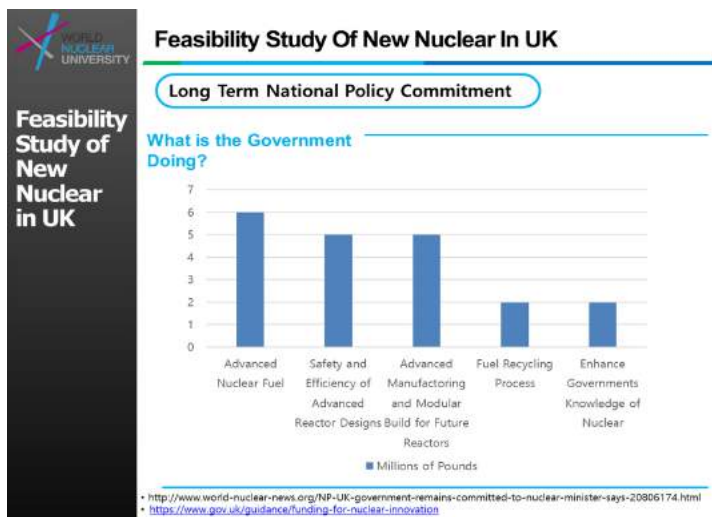
Many developing countries attempt adapting new NPP to their national grid (such as Turkey, Jordan, Thailand, Saudi Arabia, Israel, Malaysia, etc). Generally, it takes a long time to start the new nuclear project and most often, in the aforementioned countries, difficulty is faced due to the lack of sufficient financing from local banks and/or investors. As a result of these difficulties, funding must rely on from external sources partially, if not fully.

It is recommended that the government or governing authority of a country considering new nuclear power carry out a risk analysis from the beginning, in parallel with the feasibility study. This risk analysis and feasibility study combination should be an in depth analysis of the risks versus the rewards of a nuclear programme. This combined analysis should encompass three main issues: licensing project, implementation approach, and financing.

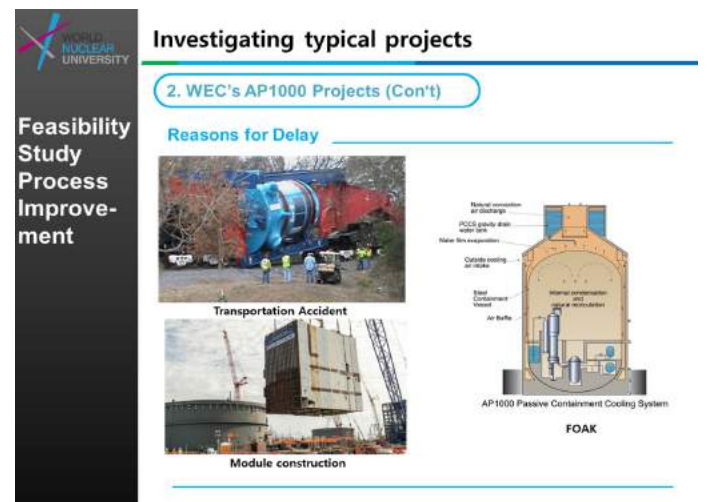
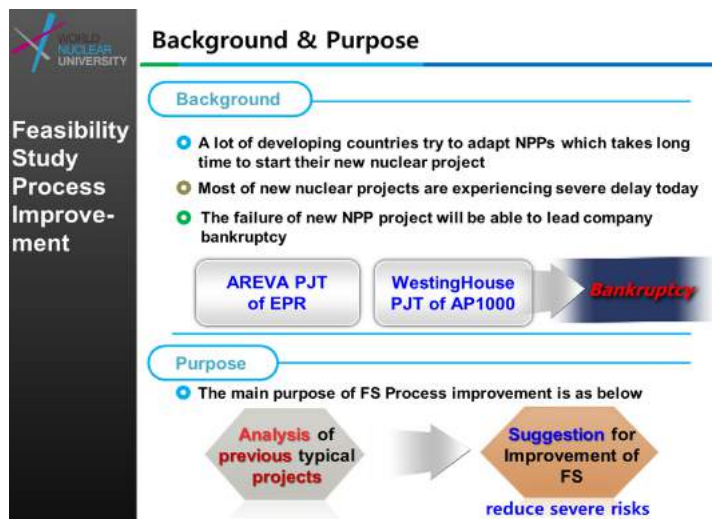
## Importance of Feasibility Study

The feasibility study of a project is the first line of defense against negative outcomes. A successful feasibility study should help the owners to see the risks and make the correct business decisions. Too many nuclear projects experience long delays, huge cost overruns and even total failure. These problems threaten to obscure the great benefits that nuclear power can bring to people around the world. Can improvements be made to the feasibility study process to increase the success rate for future nuclear new-build projects?

## Feasibility Study of New Nuclear In United Kingdom



## Feasibility Study Process Improvement



## Conclusion - What We Have Gained

- Understanding of the feasibility study process
- Knowledge of why some projects were not successful, in spite of feasibility study
- Ways to make the process easier and more successful in the future
- Experience working together in a team, building a team, and listening to others opinions



## NNI 8 | Global communications in the 21st century

The goal of NNI 8 was to develop a strategic framework that can be implemented by World Nuclear University Summer Institute fellows when communicating nuclear energy related issues to the public in their respective home countries. This is intended for use by all WNU Summer Institute fellows to help guide their interactions, formal or informal, and not only for those in the corporate/government communications field. Incorporated into this strategy are insights in effective communication that can be applied immediately. The general components of the strategy are presented for reference, and an example application is given to illustrate the guiding principles.

## Introduction

Final report of NNI 8 is intended for use by World Nuclear University Summer Institute fellows to structure their interactions with the public to increase public support for nuclear technologies, especially as a means for limiting the GHG emissions responsible for global warming. The following strategy was designed according to a methodical approach that is implemented by marketing specialists. The proposed communication plan can be divided into four main modules: audience characterisation, audience mindset, population segment weight, and communication channels. These modules are explained below, along with insights we have identified regarding typical communication errors by industry representatives in engaging with the public. A compilation of resources that will enable the fellows to implement this approach is provided in the references.

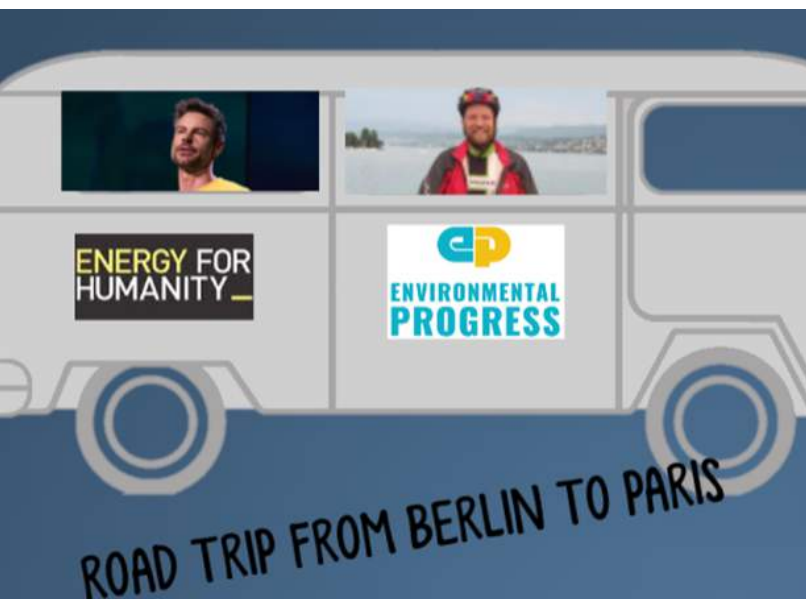
## Audience Characterisation

Identify information regarding the characteristics of the population being studied. Demographic parameters of the audience can inform on the types of messages and engagement channels. For example, using social media to engage with the public would be ineffective with older audience members, or electronic or technological resources. Relevant data includes age, gender, education, income, residence: rural and urban areas.

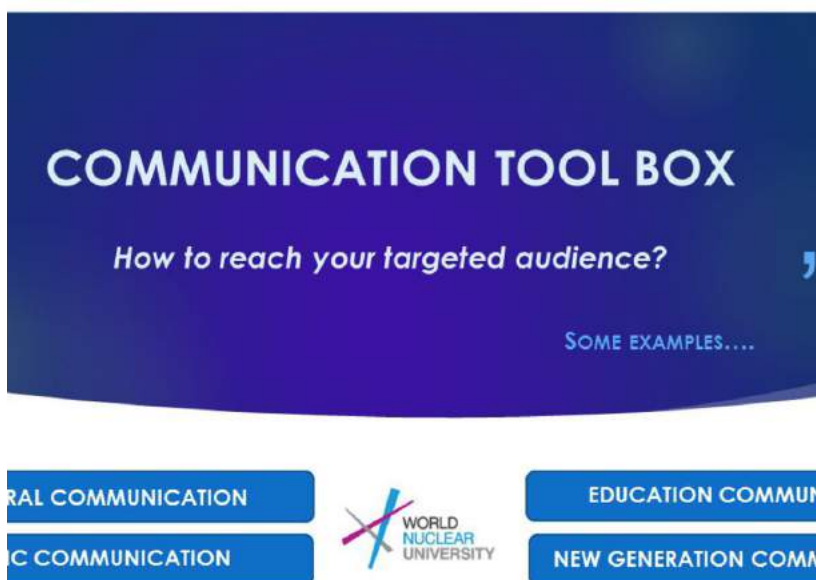
## Audience Mindset

Identify what major concerns the audience has that may be addressed by, or are related to, nuclear energy. Be aware that nuclear energy is not usually listed among the primary concerns of citizens, who focus more often on issues of employment, healthcare, or economic situation. Understanding the audience's priorities will help to identify the aspects of nuclear technology that are most effective in producing active participation by the public. This information can often be found in public polling results or analyses provided by statistics organizations. This data is especially useful in crafting messages directed to specific concerns, as well as identifying groups that may be persuaded most easily, while avoiding those whose positions are entrenched.

## Application Example



## Tool Box





**World Nuclear University**  
Tower House  
10 Southampton Street  
London WC2E 7HA  
United Kingdom

**EMAIL**

[wnu@world-nuclear-university.org](mailto:wnu@world-nuclear-university.org)

**WEB**

[www.world-nuclear-university.org](http://www.world-nuclear-university.org)

Title: Network for Nuclear Innovation  
Produced by: World Nuclear University  
Published: September 2017

This report reflects the views of the Summer Institute 2017 fellows but does not necessarily represent those of the World Nuclear University.