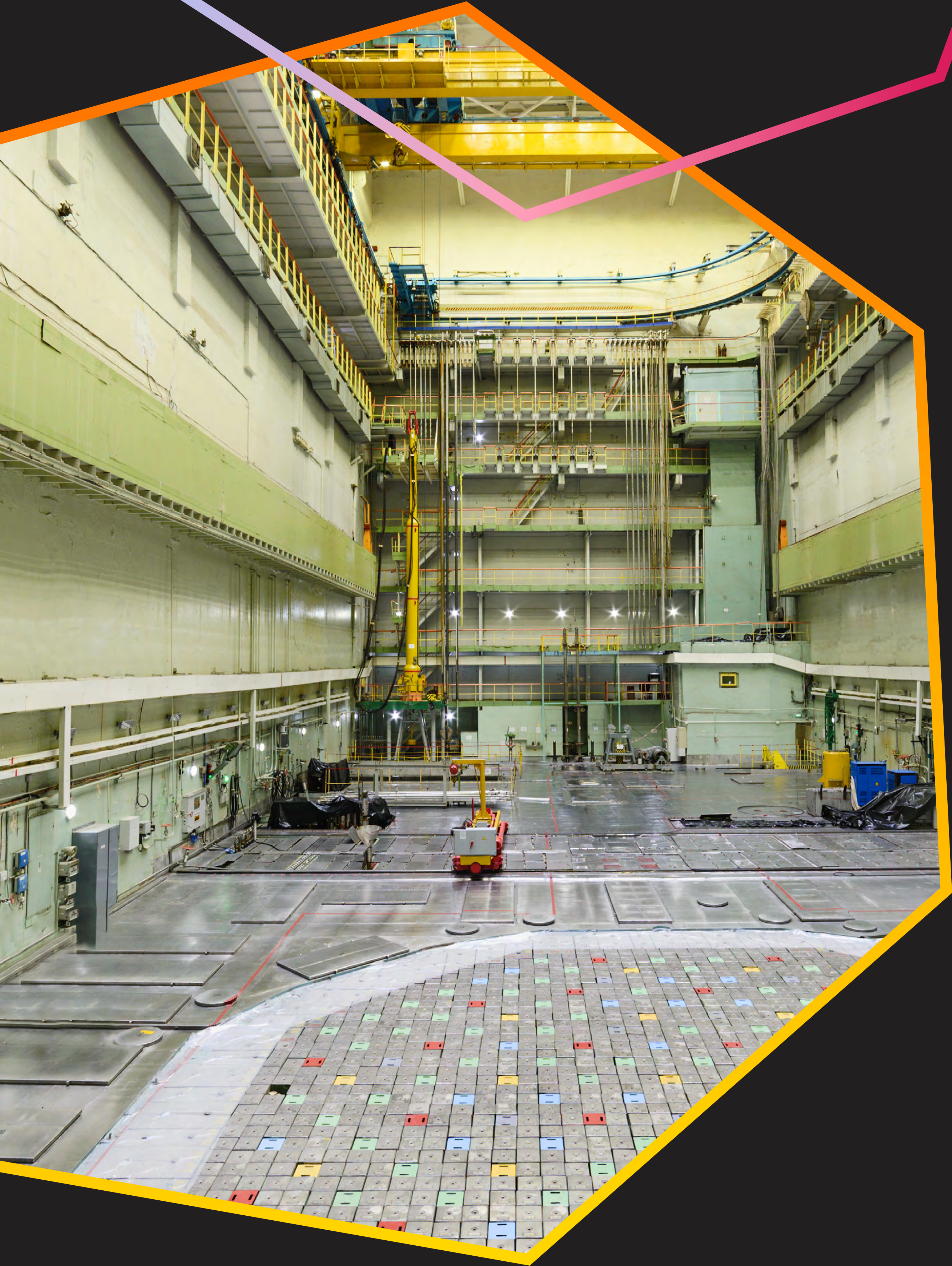
Royal Academy of Engineering | Engineering Diplomacy Hub

UK–Republic of Korea civil nuclear knowledge exchange

Insights, collaboration opportunities, and next steps

Contents



Executive summary

The United Kingdom (UK) and the Republic of Korea (RoK) are both international players in civil nuclear energy (civil nuclear), using this energy to generate approximately 15% (UK) and 30% (RoK) of their electricity in 2024.[1] Similarly, both countries have factored civil nuclear in as a means to decarbonise their electricity by 2050. This commitment is underscored by the UK – RoK Clean Energy Partnership signed by both countries in 2023, where they reaffirmed their commitment to explore opportunities for collaboration in this area.[2] Yet in the UK more sites are currently being decommissioned than are operational, and the RoK is still experiencing the repercussions of President Moon's 2017 nuclear phase-out policy.

Despite this, both countries aim to develop advanced nuclear technology over the next few years, and the exchange that took place in March 2025 contributed to revitalising discussions between both countries on civil nuclear. As a direct outcome of the Clean Energy Partnership, the Royal Academy of Engineering (RAEng) and National Academy of Engineering of Korea (NAEK) brought together leading civil nuclear experts to explore complementary strengths and opportunities surrounding civil nuclear in the UK and RoK. This was followed by a UK – Korea Atomic Energy Research Institute workshop on Advanced Nuclear Technologies two days later, organised by the British Embassy Seoul and attended by RAEng experts. This report incorporates messages from both workshops.

The key themes that were explored included:

- **Nuclear fuel cycles:** both the UK and RoK have significant experience, although with differing levels of technical maturity based on the national programmes involved. The RoK is restricted by the Korea – United States (US) Atomic Energy Agreement and therefore cannot enrich uranium and is restricted in any work to do with reprocessing or recycling. Yet, the RoK has developed some of the most advanced civil nuclear research and development (R&D) capabilities in the world.
- **Supply chains:** the RoK has very secure, fully developed and largely domestic supply chains. By contrast, the UK has struggled with supply chain security since the heyday of nuclear construction in the 1960s to the 1980s. Delegates highlighted that energy security is a key benefit of civil nuclear, yet robust supply chains are essential for these benefits to materialise. This was identified as an area where the UK and RoK could collaborate for mutually beneficial gain.
- **Advanced nuclear technologies (ANTs):** both countries are investing in next-generation nuclear technologies, with a global race underway to develop small modular reactors (SMR) and advanced modular reactors (AMR) together with the fuels required to power these systems.
- **Regulation:** speakers called for increased regulatory harmonisation between the UK and RoK to promote safety, and for mutual recognition of international reactor designs. While delegates acknowledged that both countries have adopted different regulatory approaches, with the RoK opting for a prescriptive framework, and the UK following a goal-setting approach, it was felt that more harmonisation could benefit both regimes.
- **Skills:** both countries are finding recruitment in the nuclear sector a challenge and consequently facing a skills shortfall. Attendees highlighted core competencies needed across the nuclear landscape and further emphasised the importance of hands-on training.

The UK and RoK's strengths and weaknesses in civil nuclear were assessed and were often found to be complementary to each other. For example, the RoK's expertise in pyroprocessing would benefit the UK in progressing certain advanced modular reactor (AMR) designs, and the UK Office for Nuclear Regulation's approach to licensing SMRs would be useful to the RoK. These comparative insights are outlined in the strengths and weaknesses table.

The delegates' views on future opportunities have been set out, considering smaller scale bilateral opportunities, including:

- Research institute and/or university partnership on thermal hydraulics
- Regulatory knowledge exchanges
- Academy to Academy missions

Additionally, delegates considered larger policy initiatives, such as an expansion of the Clean Energy Partnership.

Background and context

UK-RoK civil nuclear energy landscape

The UK and RoK both include increased nuclear capacity in their plans to achieve net zero.

By 2050, the UK has committed to:[3]

- Construct Hinkley Point C and Sizewell C
- Extend the lifetime of existing nuclear power plants
- Back additional new nuclear (including SMRs)
- Divest from Russia (regarding fuel supply) and counter China
- Triple domestic nuclear energy capacity to 24 gigawatt electrical
- Support R&D in AMRs and fusion energy
- Participate in Generation IV (Gen IV) R&D

Similarly, the RoK has committed to:[4]

- 28 nuclear reactors in operation by 2036, supplying 32.8% of the country's electricity
- Export ten nuclear power plants (NPPs) by 2030
- Invest in SMRs
- Participate in Generation IV (Gen IV) R&D
- Strengthen international partnerships

Both countries have targeted civil nuclear as a means to deliver large-scale, reliable, low-carbon electricity. Both countries also promote international collaboration as a route to securing supply chains, and pursue harmonisation of regulation to improve energy security and safety.

© Shutterstock

United Kingdom

Republic of Korea

1

Calder Hill

1956

UK opens world's first nuclear power plant (NPP).

2

IAEA

1957

UK and RoK join the International Atomic Energy Agency.

3

Nuclear fleet

1950s – 1980s

Magnox reactors and advanced gas-cooled reactors (AGRs) built.

4

Kori 1

1978

RoK's first NPP achieves commercial operation.

5

Privatisation

1989

Electricity industry privatised. British Energy is formed – though acquired by EDF in 2009.

6

Nuclear expansion

1980s – 1990s

Localisation plan (84) established pushing domestic capacity.

7

Hinkley Point C

2018

Construction starts for the first new UK reactor in decades.

8

Exporter

2009

UAE contract won by KEPCO – RoK becomes a nuclear exporter.

9

Net Zero

2020s

UK Government commits to 24GW of nuclear generating capacity by 2050, approximately 25% of electricity generated.

10

Net Zero

2020s

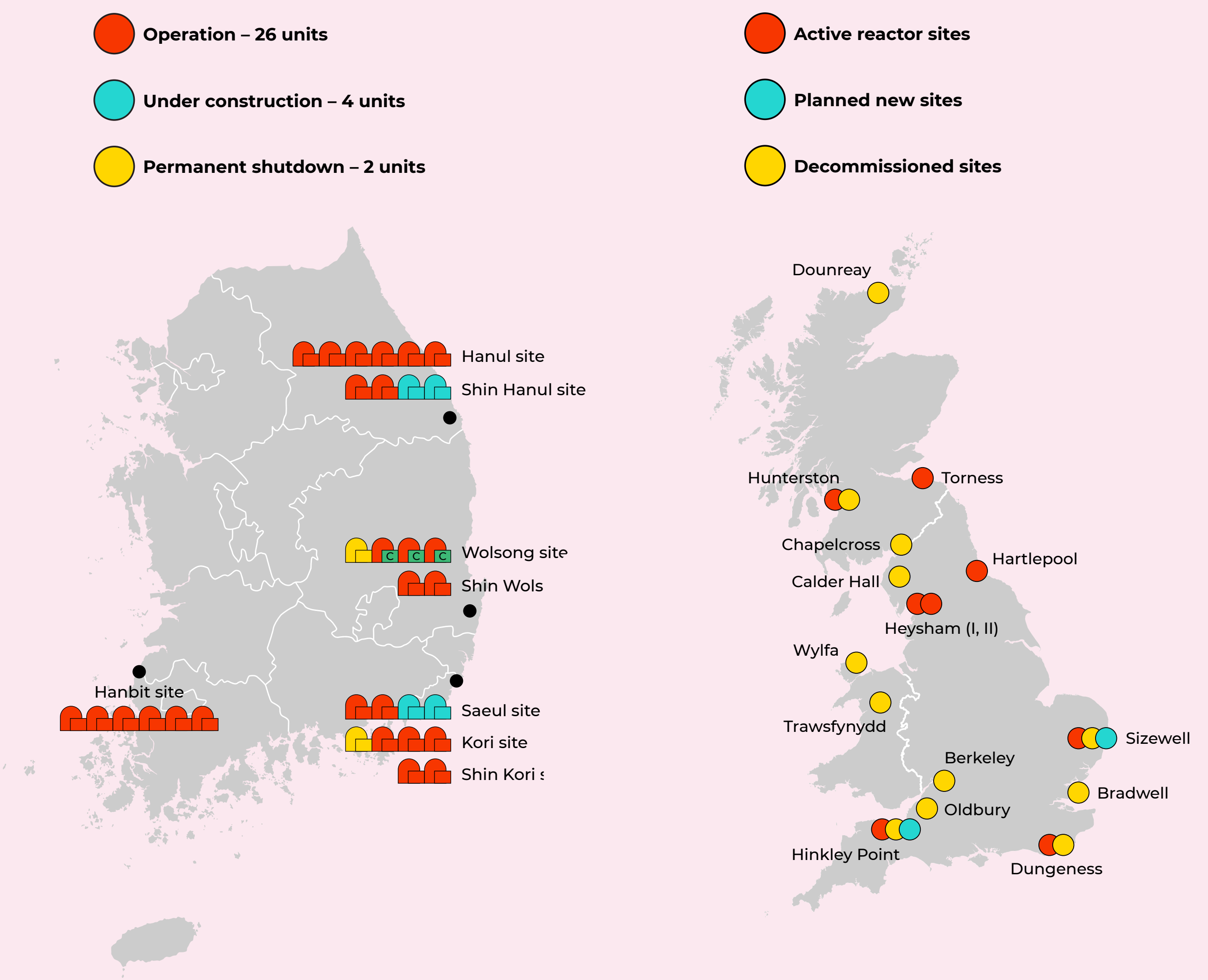
RoK are aiming to produce 32.4% of electricity from nuclear by 2036, approximately 28.9GW

Current energy mix and the status of current NPPs

In 1958, the RoK sent 237 government-funded nuclear scholars to study in the US and UK. These scholars laid the foundations for the RoK's nuclear science, technology and industry.[5] The Korea Atomic Energy Research Institute (KAERI) was later established in 1959. Today, approximately 30% of the country's electricity is generated from nuclear power, with 26 NPPs in operation. 22 of these are pressurised water reactors (PWRs), and the other four are pressurised heavy water reactors (PHWRs). Four NPPs are under construction, with two units expected to be in operation by 2026, and the other two by 2033.[6]

Meanwhile the UK has eight NPPs in operation, seven advanced gas-cooled reactors (AGRs) and one PWR (Sizewell B) – with two projects, Hinkley Point C and Sizewell C, in development. Civil nuclear makes up approximately 15% of UK electricity, a decline from 25% in the mid-1990s. This will likely decrease, with the last AGR site closing by 2030 latest.[7]

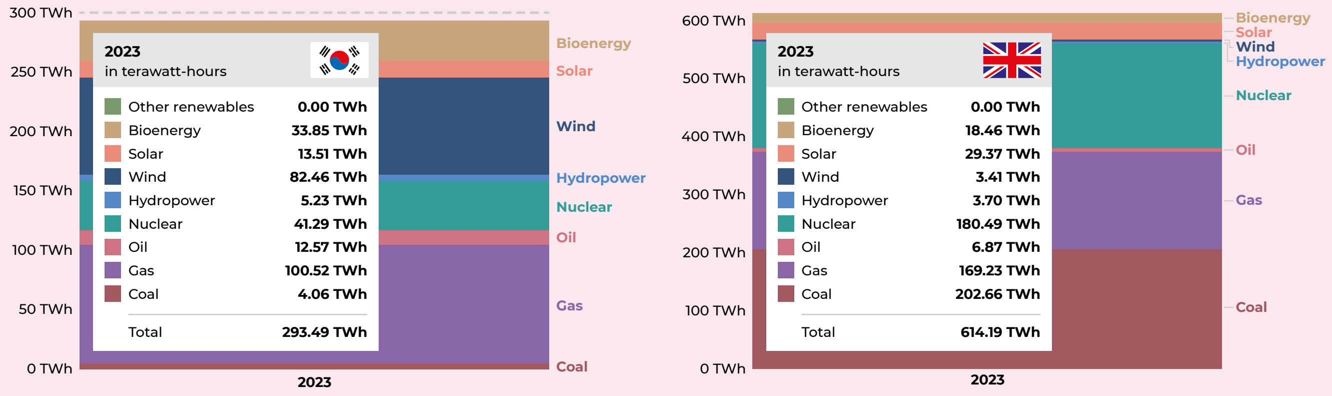
Figure a: The status of nuclear power plants in the RoK (left) and the UK (right). Source: RAEng x NAEK Clean Energy workshop.



The RoK began its nuclear journey after the UK, but its 1984 **localisation plan** strengthened its supply chains ensuring consistent construction despite the **nuclear phase out policy** declared by President Moon (from 2017 to 2021). The UK slowed nuclear production after the 1990s, and privatised the industry. The launch of Great British Energy – Nuclear in 2023 reintroduced government involvement in civil nuclear, with aims of de-risking civil nuclear investment and driving new civil nuclear projects.

These aims were reaffirmed, with Energy Secretary Ed Miliband suggesting that the UK government is 'delivering a golden age of new nuclear', with Sizewell C receiving £14.2 billion in government funding, and Rolls-Royce selected to build the country's first SMRs.[8] Both the UK and the RoK are investing in SMRs for fast, flexible and less costly civil nuclear deployment.

Figure b: Electricity production in 2023 by source in the RoK (left) and UK (right). In the RoK this is 180.49 terawatt-hours (TWh) of nuclear, equivalent to 29.39% of its electricity mix. The UK produced 41.29 TWh, 14.07% of its production. Figures regarding nuclear production remain similar in 2025, varying by approximately 1%. Source: Our World in Data.[9]



President Moon's nuclear phase-out policy

Introduced after the 2017 election, this policy halted new reactor construction and prohibited extending operational lifespans of existing reactors. It aimed to reduce nuclear in the RoK's energy mix, instead promoting renewable energy. This contributed to the increasing politicisation of renewables versus nuclear in the RoK today. This policy was reversed by People Power Party politician President Yoon in 2022. Please note, following this exchange in June 2025 Democratic Party candidate Lee Jae-myung was elected and he has emphasised a 'pragmatic' approach to civil nuclear. He has pledged renewable energy expansion, while acknowledging the importance of nuclear energy for supply stability and energy security.

Localisation plan

This long-term strategy aimed to reduce dependence on foreign technology by developing domestic reactors and nuclear systems. This reduced costs, strengthened local supply chains and built industrial capability. Even during the phase-out policy, the RoK continued to grow its industry capabilities and successfully exported its latest NPP design firstly to the UAE and later to Europe.

Overview of UK-RoK collaboration on nuclear energy

The UK and RoK are involved in several bilateral and multilateral civil nuclear agreements, fostering aligned perspectives and a strong foundation for collaboration. These agreements were frequently referenced during the UK-Korea Clean Energy Workshop:

Agreement name	Year signed	Type of agreement	Key points
International Atomic Energy Agency (IAEA)	1957	Multilateral partnership	■ The UK and RoK are both founding members of the IAEA, the most prominent international regulatory body for nuclear. ■ Set up as the 'Atoms for Peace' organisation within the United Nations. ■ Objectives are to 'accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world. Ensuring so far as it is able that the Atom is not used to further any military purpose.[10]
Organisation for Economic Co-operation and Development Nuclear Energy Agency (OECD NEA)	1958 as the European Nuclear Energy Agency, changed to NEA in 1972	Multilateral partnership	■ Focuses on nuclear energy policy, research and safety between its member states.[11] ■ Aims to provide authoritative assessments and to forge common understanding on key issues. ■ The Advanced Thermal Hydraulic Test Loop for Accident Simulation (ATLAS) project stems from this partnership. This test loop is operated by KAERI. KAERI has been key in driving this project forward; the UK has not engaged in ATLAS yet.
Generation IV International Forum (GIF)	2005 initially, extended in 2015. Renewed in 2025	Multilateral partnership	■ Focus is on developing Gen IV civil nuclear systems that are sustainable, economically viable, safe and reliable, and resistant to proliferation and physical threats. ■ As of March 2025, the new framework agreement has been signed the UK, Canada, France, Japan, Switzerland and the US. RoK are likely to do so soon. ■ The framework is the world's first agreement created to facilitate international research on developing Gen IV reactor concepts.
UK-RoK Clean Energy Partnership[12]	2023	Bilateral partnership	■ Involved three MOUs being signed. ■ Commitments included exploring opportunities for collaboration on civil nuclear new-build programmes, strengthening fuel supply chains, safety, security and non-proliferation, decommissioning and waste management and third country collaboration. ■ Also aimed to explore collaboration opportunities on developing gigawatt-scale civil nuclear reactors, SMRs and other AMRs, as well as financing and funding models.

Purpose of the seminar and its relevance to both countries

This exchange aimed to deepen the existing UK – RoK partnership on civil nuclear, acting as a platform to explore complementary strengths in civil nuclear and its role in a low-carbon energy system. It took place between 17 and 22 March 2025 in RoK, following an initial exchange on the same topic, which took place in July 2024 in London. This reciprocal exchange focused on key challenges and opportunities, including barriers to nuclear deployment, advanced reactor technologies, and regulatory approaches. The exchange had the following objectives:

- Identify areas for UK-RoK nuclear collaboration, focusing on leveraging complementary strengths in supply chain capabilities, engineering expertise, and innovation.
- Facilitate cross-national discussions on advanced reactor technologies, including the role of Gen IV reactors and the use of high-assay low-enriched uranium (HALEU), exploring their feasibility, deployment challenges, and long-term sustainability.
- Compare and assess the regulatory and policy frameworks for nuclear energy in both countries.
- Identify further partnership opportunities, incorporating international expertise to advanced shared goals in innovation, safety, and nuclear sector growth.
- Form and strengthen connections within the UK delegation, fostering collaboration among UK experts alongside engagement with Korean partners.
- Leverage insights from the July 2024 exchange to deepen UK-RoK collaboration in the nuclear sector.

To do this, the exchange included two workshops – one hosted by the NAEK, and a second organised by KAERI in partnership with the UK Department for Energy Security and Net Zero. The delegation also visited KAERI, seeing ATLAS, the Sodium Integral Effect Test Loop for Safety Simulation and Assessment 2 (STELLA 2), and the High-flux Advanced Neutron Application Reactor (HANARO) – a key source of medical isotopes. You can find more information about the agenda in annex 1.

This overview synthesises learnings from these events, providing a summary and analysis of key discussions. It captures key themes and highlights opportunities for deepening cooperation in the civil nuclear sector. It is intended to inform stakeholders about the civil nuclear landscape in UK and RoK and serve as a reference for identifying strategic priorities in civil nuclear collaboration, research, policy, and innovation.

Please note: the insights provided are synthesised from discussions held during the exchange and have been compiled for informational purposes only. The findings, and conclusions presented in this report, do not officially represent the views of the Royal Academy of Engineering, His Majesty's government, or delegate organisations affiliated with this report.

“Given the current geopolitical climate, both nations have an even greater leadership role to play in pushing through net zero. [Following the government's decision to] have a strategic partnership with RoK, this exchange is meant to underscore the strength of this partnership.”

– UK delegate, Clean Energy Workshop

Key discussion points

Fuel cycles, supply chains, and advanced nuclear technologies were recurring themes – all underpinned by the core enablers of regulation and skills, which are essential to progress in any of these areas.

Nuclear fuel cycles

The UK has full nuclear sovereignty and is therefore able to manage its entire fuel cycle independently. In contrast, RoK operates under restricted nuclear autonomy, with its fuel cycle shaped by US oversight and **123 agreement constraints**. You can see a comparison of both countries' fuel cycle below:[13]

Korea-US Atomic Energy Agreement, 1974 (123 Agreement)

Initially constrained raw material supply and did not allow uranium enrichment or reprocessing used fuels. The RoK described this as excessive, and the agreement therefore was altered before a 20-year extension agreement was signed in 2015. This established a High-Level Bilateral Commission between both countries to work together to advance addressing spent fuel management, fuel supply, nuclear security and enhanced cooperation between both nuclear industries. It reinforced the Joint Fuel Cycle Study to review and identify options for addressing spent fuel management challenges, facilitate cooperation on R&D in this context, including at specified facilities on the use of electrochemical reduction. It also gives the RoK consent to produce radioisotopes for medical and research purposes (such as HANARO), and examine irradiated fuel rods using US obligated material.

Stage	United Kingdom	Republic of Korea
Mining and milling	No economically recoverable uranium – imports it.	No economically recoverable uranium – imports it.
Conversion	Previously did this but due to overcapacity in the global market ceased as not economically competitive – done overseas. *	Not economically competitive – done overseas. *
Enrichment	Capenhurst, Urenco enrichment plant – currently 4.5 million separative work unit (SWU) per year (<5% low enriched uranium). Developing HALEU capability.	Prohibited under the 123 Agreement.
Fuel fabrication	Springfields, Westinghouse, produces 800 tonnes of uranium a year, for PWRs and AGRs.	KEPCO, Korea Nuclear Fuel, produces approximately 600-800 tonnes of uranium a year, for PWRs and PHWRs.
Reprocessing	Sellafield previously did this but has shut down. Significant waste treatment and storage activities on site currently.	Limited to joint R&D with the US on pyroprocessing under 2015 123 agreement.
Waste storage and disposal	Nuclear Decommissioning Authority is planning a suitable geological disposal facility – aims for this to be operational by 2040-50.	Stores spent fuel on-site at reactors – interim storage is problematic due to a lack of space. Beginning to select a site for geological disposal but this is politically sensitive.

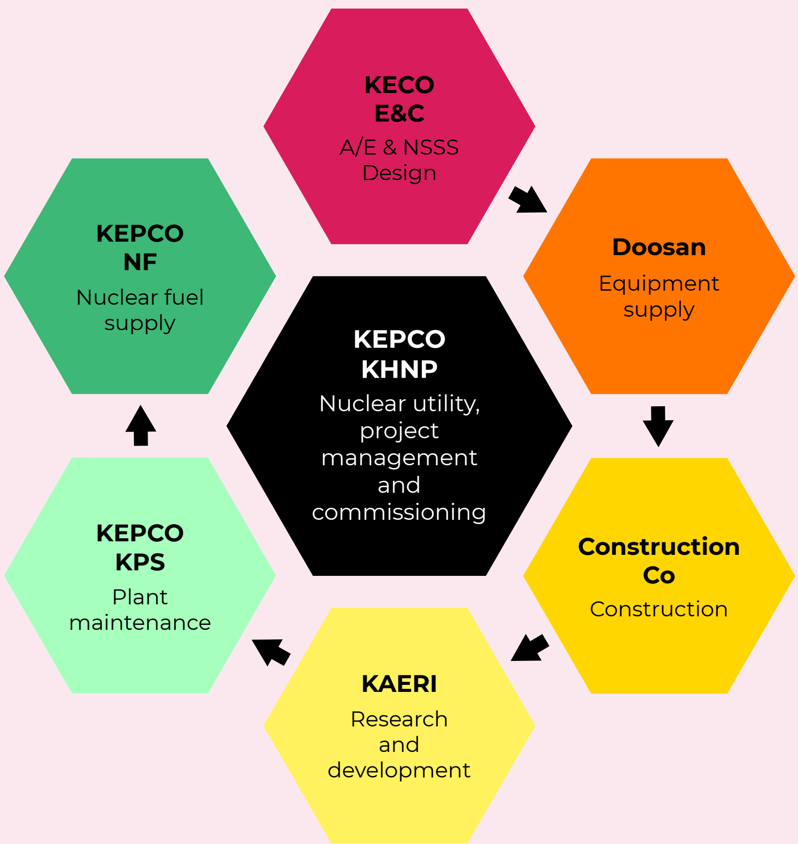
**This may change due to Russian sanctions.*

Supply chains

A secure supply chain is essential for civil nuclear to deliver reliable, stable energy. Delegates highlighted that:

- Civil nuclear is powerful and sustainable. One nuclear pellet the size of a thumbnail produces the energy equivalent to 1 tonne of coal, which could power an electric car for 20,000 miles. It also produces less CO_2 emissions over its lifecycle than any other electricity source.[14] Civil nuclear is considered advantageous over renewables because of this energy security. However, civil nuclear supply chains are often more complex and interdependent than renewables, and without securing them, the benefits of energy security are compromised.
- The RoK has developed robust and reliable supply chains to serve construction projects and ongoing nuclear power plant operations. Its nuclear sector is operating the cheapest nuclear plants internationally.[15] The RoK's role in constructing the NPP in Barakah highlighted its strength in supply chains and emphasises its emergence as a global nuclear exporter. Its track record in construction is second to none in the global nuclear sector. Yet the fact that it is only manufacturing nuclear fuel and importing the necessary raw materials has led to insecurity regarding nuclear fuel supply.
- Cost and financing models are a key barrier (or enabler) regarding civil nuclear supply chains. In the UK, 78% of the levelised cost of electricity comes from capital investment, discouraging many private companies from building NPPs due to the risk involved. This creates uncertainty through the supply chain from the onset.[16] Alternatively, the RoK's nuclear industry has stronger centralised control, and uses a public-private partnership (PPP) model, allowing it to mobilise capital more efficiently, and ensuring the supply chain is engaged.[17]
- The strength associated with the RoK's PPP model is highlighted by **Figure c**. Doosan and Construction Co. are private companies working with public companies to ensure a secure supply chain and shared financial risk.[18]

Figure c: an example of the RoK's civil nuclear supply chain. Source: Clean Energy Workshop.



Advanced nuclear technologies

Advanced nuclear technologies (ANTs) include the wide range of innovative small and advanced reactors under development in the nuclear sector, including SMRs, AMRs and micro modular reactors (MMRs). ANTs are smaller in size, both in terms of power output and land footprint, than large gigawatt-scale reactors.[19]

The discussions primarily focused on SMRs and AMRs (Gen IV technology) such as molten salt reactors, sodium cooled fast reactors, and very high temperature gas reactors with fuel from high assay low enriched uranium as an enabler. RoK colleagues focused on molten salt reactors and sodium cooled fast reactors during discussions.

Small modular reactors (SMRs)

- Both countries have invested in SMRs and acknowledged the technology's potential to change the nuclear energy landscape. Unlike traditional NPPs which are built on site and tailored to specific locations, SMRs can be manufactured in factories and shipped to order, cutting costs, risk, and time.
- Globally approximately 80 SMR-type developers are competing to be the 'first mover', though this number is rapidly increasing.[20]
- Great British Energy – Nuclear has selected Rolls-Royce SMR Limited to build the UK's first SMRs after a two-year selection process that saw them compete with GE-Hitachi Nuclear Energy International LLC, Holtec Britain Ltd and Westinghouse Electric Company UK Ltd. Similarly, in February 2025 the Prime Minister pledged to reform planning rules, explicitly including small nuclear plants and removing limitations on where nuclear sites can be located – seemingly in preparation for future SMR builds.[21]
- Several companies active in the RoK have invested in SMRs, including Doosan Enerbility, GS Energy, Samsung C&T, Natrum, Seaborg and Holtec. The RoK's position as a world leader in SMRs was highlighted in 2012 when the country received the first regulatory approval for a SMR design, the system-integrated modular advanced reactor (SMART). SMART100 has since received updated standard design approval in 2024, and the RoK is working to commercialise it.

Molten salt reactors (MSRs)

- RoK's 6th Comprehensive Nuclear Energy Promotion Plan (2022 to 2026) specifies the aim of 'securing basic technology for MSRs suitable for mobile nuclear energy system and ship propulsion.'[23] This is manifesting in the molten salt reactor development project (KARPA), led by KAERI. Its design is intended for use in marine vessels to address the International Maritime Organisation's agreement to reduce greenhouse gas emissions from ships. The project is planned to run from 2023 to approximately 2026.

> "Small modular reactors will support our mission to become a clean energy superpower."
>
> **– Secretary of State for Energy Security and Net Zero, Rt Hon Ed Miliband MP[22]**

Sodium-cooled fast reactors (SFRs)

- The RoK started researching SFRs in the 1990s, and has been praised for successfully transferring legacy knowledge in this area.[24] Success in this area could lead to a solution to the spent nuclear fuel that the RoK currently stores. The country is exploring pyroprocessing spent fuel with its Korea Advanced LIquid MEtal Reactor (KALIMER)-600 SFR reactor. The concept has been established, but due to restrictions, the RoK is not reprocessing spent nuclear fuel commercially. Rather, its research aims to show the potential of SFRs for safety, efficiency and waste reduction.
- STELLA-2 is a test facility in Daejon designed to simulate and analyse SFRs, to assess the safety and reliability of SFRs in the RoK (and countries collaborating with RoK). STELLA-2 conducts experiments to assess how SFRs would respond to real-world operational transients.
- The UK's historic operation of the Dounreay Fast Reactor (1959 to 1977) and the Prototype Fast Reactor (1974 to 1994) has resulted in an extensive SFR research archive.

Very high temperature gas-cooled reactors (VHTGR)

- According to a technical analysis by the Nuclear Innovation Research Office, high-temperature gas-cooled reactors (HTGRs) are the most highly ranked advanced modular reactor (AMR) technology in the UK's efforts to achieve net zero. The maturity of the technology, its synergies with UK technical experience, and historical operating experience are cited as the reasons for this. EDF Energy is exploring options for some of its former AGR sites to be used for HTGRs, and the UK government is supporting technology development by committing millions to build a HALEU enrichment facility, for example.[25] The UK has historic experience of HTGRs, being the site of an early European demonstrator project called DRAGON.
- The RoK also acknowledges the benefits of VHTGRs for low-carbon industry heat, not only because they can generate electricity, but also because their high-temperature output is suited to produce hydrogen, synthesise ammonia, and drive ethane and naphtha steam cracking. One example is the helium-cooled thermal application reactor (HECTAR) project, which aims to take four years (2024 to 2027) with a budget of approximately $31 million (funded at a ratio of 17:14 public to private funding).[26] It is designed to produce industrial heat, with outlet temperatures of 750°C.

Figure d: HECTAR supply chains – an example of the RoK's strength in this area.

Supplier	Role
KAERI	Reactor core design, fluid system design, nuclear fuel design, in-core structure design
POSCO E&C	Project management, balance of plant (BOP) design, license planning
DAEWOO E&C	Radiation protection, radioactive waste management
SMART POWER	On-site power supply
SK ecoplant	Solid oxide electrolyser cell (SOEC) hydrogen production system
LOTTE Chemical	Process heat system for petrochemical plant

High assay low enriched uranium (HALEU)

HALEU: High Assay Low Enriched Uranium (fuel enriched to between 10% and 20% of the U-235 isotope) is a fuel that many next generation reactor designs require. HALEU can be used to make oxide, salt and metal as fuel and will power many advanced (Gen IV) reactors.

- To enable Gen IV designs to have a role in the UK's net zero aims, in 2023 the UK government announced up to £300 million to establish a domestic HALEU supply chain, aiming to deliver a full domestic capability.[27] This includes £196 million to Urenco to design and build a HALEU enrichment facility by 2031, £70 million for deconversion, £6 million for regulation, and £11 million to establish road transport capability for HALEU.[28]
- It has been estimated that 100 kilograms of HALEU (at 15.5% enrichment) will be needed to make fuel to power HTGRs in the RoK, as well as 2 tons for initial commercial-scale production.[29]

Case study: High-flux Advanced Neutron Application Reactor (HANARO)

Based at KAERI in Daejon, HANARO is used for the RoK's R&D, studying fuels, producing medical isotopes and studying reactor component aging. It highlights the RoK's long-term investment in advanced nuclear research infrastructure, and positions the country as a leader in materials and fuel testing for advanced reactors. Delegates noted that a comparable research reactor in UK would strengthen domestic R&D capabilities, with the RoK being in a position to be the UK's supplier.

Regulation

Regulation: the action of making and enforcing rules to control activities.[30]

Who regulates?

- Internationally: International Atomic Energy Agency (IAEA) sets global standards.
- UK: Office for Nuclear Regulation (ONR). The Nuclear Regulatory Taskforce was set up in 2025 to explore how nuclear regulation can be improved.
- RoK: Korea Institute of Nuclear Safety (KINS). Nuclear Safety and Security Commission (NSSC).

Laws are based on national legal frameworks, and therefore nuclear safety is technically a national responsibility. However, nuclear regulation can be 'harmonised' to ensure despite the legal framework of the country, the same outcome is delivered: safety. The Convention on Nuclear Safety (CNS) treaty reinforces the UK and RoK's commitment to harmonisation, with the treaty fostering transparency and international peer review surrounding nuclear safety.

The IAEA has created safety standards setting out requirements for an effective nuclear safety regulatory body, which are widely recognised. It has also developed guidance on what a nuclear safety legal framework should contain. These frameworks are a means for countries to implement CNS commitments.

With governments responsible for establishing legal frameworks and the regulatory bodies, these have consequently differed with 'prescription' and 'goal-setting' approaches being the consequence. The UK has a goal-setting approach, and the RoK's legal framework is a prescription approach.

IAEA Safety Fundamentals: standards developed for an effective nuclear safety regulatory body	**IAEA Handbook on Nuclear Law – key principles on what a nuclear safety legal framework should contain**	
	Principle	**Explanation**
Responsibility for safety	Safety principle	Safety is paramount
Role of government	Security principle	Protection against sabotage and theft of nuclear materials
Leadership and management for safety	Responsibility principle	Licensee / operator responsible for safety
Justification for facilities and activities	Permission principle	Prior permission required before safety-related activities undertaken
Optimisation of protection	Continuous control principle	Continuing ability to monitor licensee's activities
Limitations of risk to individuals	Compliance principle	Duty to comply with international treaties and conventions
Protection of present and future generations	Independence principle	Regulatory body must be independent of those responsible for the development or promotion of nuclear energy
Prevention of accidents	Transparency principle	Duty to be open in relation to incidents and abnormal occurrences
Emergency preparedness and response		
Protective actions to reduce existing or unregulated risks		

- Goal-setting: the licensee is responsible for nuclear safety. The regulator will set goals, for example, demonstrate that under all design-basis accidents, the reactor core remains adequately cooled and damage is prevented. The licensee will decide how to deliver this.
- Prescriptive: the regulator will set out exactly what steps to take, for example, the emergency core cooling system must include a high-pressure injection system with a capacity of X and a low-pressure injection system. The licensee will have to deliver this according to the regulator's requirements.

Harmonisation should facilitate commercialisation of Gen IV designs, and the initiatives below aim to promote this.

Despite these initiatives, delegates noted that when powering Gen IV with HALEU, regulatory bodies will likely need to expand capability and capacity and as such may need to train more inspectors and assessors to undertake:

- Design safety reviews
- Nuclear safety case assessment
- Inspections for nuclear safety, security and safeguards

And may need more expertise in criticality for:

- Assessments for fuel cycle facilities
- Licensing of transport containers and spent fuel casks
- Spent fuel storage
- Reprocessing
- Spent fuel disposal

Harmonisation initiatives	Purpose
IAEA's Nuclear Harmonisation Standardisation Initiative	■ Long term vision to develop regulatory harmonisation, and industrial standardisation ■ Accelerate safe deployment of advanced nuclear reactors, especially SMRs
OECD NEA Multinational Design Evaluation Programme	■ Promote harmonisation of regulatory practices ■ Share technical evaluations and licensing experiences ■ Accelerate design approval e.g. the RoK's APR1400
WNA Cooperation in Reactor Design Evaluation and Licensing	■ 'One design, one review' principle – reactor designs approved in one country to be accepted in others ■ Supports standardised codes and safety assessments for global deployment

Skills

Delegates acknowledged that a strong and stable nuclear workforce is essential for the civil nuclear sector to continue, with clear shortfalls in the UK and RoK.

Delegates identified the following core competencies of nuclear talent, which should be a focus of planning for training courses and reskilling:

- Exploratory planning skills: to be able to account for uncertainties, regulatory developments, safety margins, and project timelines.
- Problem-solving skills: including a systems thinking approach.
- Communication skills: internally and externally.
- Resilience: crucial in a high-pressured environment.
- Sense of compliance: integral for nuclear safety.
- Technical expertise: specialised knowledge in the area of focus.

Competency requires a combination of traditional education and practical, hands-on experience.[39]

Additionally, delegates considered the following key questions:

- How can we ensure retention is also prioritised?
- How can we not over-specify nuclear experience – where do we really need it?
- What entry routes can we create?
- How can companies best manage workload in isolated areas, far from home?
- What work do we want to be done by humans? What can we realistically give to machines and AI?

United Kingdom	Republic of Korea
The nuclear workforce has a shortfall of approximately 9,400 people and must grow by 40,000 by 2030.[31]	The nuclear workforce has a shortfall of approximately 3000 people and must grow by 11,000 by 2030.[32]
Approximately 35% of the current workforce is over 50 years old.[33]	Workforce is aging rapidly: in the manufacturing sector, the proportion of workers over 50 grew from 15.7% in 2010 to 30.1% in 2020.[34]
The construction industry will need 600,000 more workers by 2030. The global construction industry is expected to grow from $13 trillion in 2023 to $22 trillion in 2040.[35]	Of the RoK's 1.03 million construction engineers, 26.8% are over 60, equating to over 277,000. This number is nearly 19,000 more than the 258,143 in their 40s, who now account for just 24.9% of the workforce.[36] The RoK's official retirement age is 60.
In 2025, 15 universities offer nuclear energy programmes.[37]	In 2025, 17 universities offer nuclear energy programmes. Yet, enrolled students have declined: in 2017 there were 2777 enrolled students in nuclear programmes, while in 2024 there were 2156.[38]

Strengths, challenges and comparative insights

Research and development

UK

Strengths:

- Strong foundation in nuclear technology development and expertise, particularly AGRs and safety.
- Decommissioning expertise.
- Strong in thermal hydraulics including talent and modelling.

Challenges:

- Lacks large-scale experimental facilities such as ATLAS, which will slow validation and increase reliance on other nations.
- Continuity of experience is lacking – periods of over 20 years without constructing.

RoK

Strengths:

- World-class facilities at KAERI, allows for large-scale experimental facilities.
- R&D is well linked to multi-lateral organisations, funding and programmes.
- Broad focus on multiple ANTs.
- Continuous experience in nuclear deployment.

Challenges:

- Autonomy is restricted due to 123 Agreement.
- Political polarisation – the nuclear phase-out period highlighted the effect politics can have on RoK's nuclear industry.

Shared

Strengths:

- Currently actively constructing new NPPs.
- Promoting the development of SMRs.
- Active members of international nuclear bodies, contributing to R&D, regulatory and safety frameworks.

Challenges:

- Public opinion tends to be sceptical about civil nuclear.

Comparative insights

- The RoK and UK could deepen collaboration by sharing expertise and testing facilities to support the safe development of Gen IV reactor technologies.
- Continue to work with international organisations to shape regulatory frameworks for SMRs.
- The UK could learn from the RoK's experience of continuously constructing NPPs for over 40 years.
- Further invest in changing public opinion, using data from KAERI facilities.

Fuel cycles and supply chains

UK

Strengths:

- Advanced nuclear fuel cycle programme at National Nuclear Laboratory.
- Full nuclear sovereignty means the UK can enrich fuel to create HALEU and reprocess, if it had the facilities.

Weaknesses:

- Currently no reprocessing facility.
- Number of sites being decommissioned exceeds number in operation. By 2030, Sizewell B may be the only NPP in operation – this hasn't been the case since 1946.
- High upfront costs discourage companies from building NPPs, leading to stagnant supply chains.

RoK

Strengths:

- Well-established supply chains.
- Successful commercial NPP exporter (e.g. APR-1400).
- Advanced fuel fabrication and pyroprocessing technology.
- Cost-effective construction and export record.

Weaknesses:

- Enrichment and reprocessing are restricted due to 123 Agreements.
- Geological disposal is politically sensitive.

Shared

Strengths:

- Global leaders in nuclear supply chain development.

Weaknesses:

- Securing nuclear fuel: following the Ukraine war, alongside US and China power struggle, the global market has been increasingly uncertain.
- No geological disposal site.

Comparative insights

- The RoK can overcome a barrier to Gen IV development by importing HALEU from the UK.
- The RoK can manufacture components to support the UK's supply chain.
- Pyroprocessing technology would be beneficial to the UK in securing their investments in AMRs.
- The UK could reduce high upfront costs by following the RoK's model of public-private partnership.

Strengths, challenges and comparative insights

Regulation

UK

- Robust, flexible legal framework and site licensing regime.
- Goal-setting approach encourages continuous improvement and innovation.
- Able to license and operate existing thermal hydraulic designs based on historical validation, vendor data and international collaboration.

- Goal-setting regulatory approach can create uncertainty due to a lack of clear guidance, delaying projects.
- Lack of large-scale, integrated test reactors.

RoK

- Testing facilities at KAERI are excellent– generating evidence to support licensing.

- Prescriptive regulatory approach can make adapting to new technology slow.
- The NSSC is functionally independent, but is government-funded and reports directly to the Prime Minister. Therefore, it is more susceptible to political shifts.

Shared

- Regulation is consistent with IAEA principles; both countries have strong reputations for nuclear regulation.

- Regulation is a lengthy process, delaying deployment which can increase costs.
- Regulators may not be equipped to regulate new technology.

Comparative insights

- There may be scope for the RoK to reconsider its current regulatory approach.
- The UK could share the ONR approach to regulating SMRs through the enabling framework.
- The UK could consider building testing facilities like those at KAERI.
- Retrain regulators for ANT.

Skills

UK

- Experienced workforce in full nuclear cycle.

- Training quality varies, industry-recognised competence schemes are not unified.
- Gaps in science teachers at secondary and university level, including nuclear master's, PhDs, research associates, research fellows, and professors.

RoK

- There are direct pathways from university to careers.
- Very strong construction skills.

- Limited experience in decommissioning.

Shared

- Respected nuclear programmes being taught throughout the country.

- Approximately 30% of the workforce are over 50.
- Shortfall of workers to meet 2030 needs.
- Decline in university admission rates.

Comparative insights

- More emphasis on retraining could help meet the needs of 2030.
- Redesign work to create a sustained, diverse and high-performing, happy workforce through strategic planning, career and skill pathways.
- Knowledge exchange in civil nuclear would be beneficial to both countries.

© Shutterstock

Delegate views on future opportunities

Delegates gave their views on future opportunities for UK-RoK collaboration, which are summarised below. These are not framed as recommendations, but rather a record of suggestions made at the event. When considering next steps, it is important to be aware that exchange in this area is delicate. If any of these suggestions are taken forward, it will be necessary to ensure compliance with national security, intellectual property management and export control policies.

Bilateral opportunities

The delegates felt that there were clear opportunities for collaboration between the UK and RoK which would lead to mutual benefits. However, given the sensitive nature of civil nuclear, these would likely require government oversight. Organisations should also leverage existing intergovernmental cooperation frameworks to provide a strong foundation for pursuing these opportunities. Ideas discussed included:

Research institute and/or university partnership on thermal hydraulics

- A testbed for collaboration, data and knowledge sharing:
  - Collaborative approach for thermal hydraulic data generation and simulation across multiple advanced nuclear reactor technologies (including but not limited to high temperature reactors, fast reactors, MSRs and small modular light water reactors) to:
    - Generate new thermal hydraulic data and
    - Cross-validate data and models, benchmark code, and improve data accuracy and validation
  - This partnership could take advantage of the UK and RoK's thermal hydraulic data sets, infrastructure and talent, reducing the duplication of work, and creating greater value for money while underpinning data for advanced reactors.
  - This test bed collaboration could include:
    - A joint programme on thermal hydraulic data creation and sharing, together with model and code verification and validation
    - Talent exchange between institutes and/or universities
    - Key stakeholders: Korean Atomic Energy Research Institute, Korea Institute of Energy Research, UK National Nuclear Laboratory, UK Atomic Energy Agency, University of Manchester Dalton Nuclear Institute, University of Bangor Nuclear Futures Institute, Korea Advanced Institute of Science and Technology, Hanyang University

Regulatory knowledge exchange:

- Hold comparative workshops discussing UK and RoK regulatory frameworks and licensing with a view to understanding strengths, weaknesses, similarities and differences between both regulatory approaches. This could be a series of sessions, with example topics including:
  - approach to regulation
  - enabling innovation in regulation
  - ease of regulating multiple types of reactor technology
  - transportation of nuclear materials
  - regulation of light water SMRs
  - regulation of ANTs
  - regulatory burden and economics
  - lessons learned in regulating nuclear power plants.
- Key stakeholders: Office for Nuclear Regulation, Korea Institute of Nuclear Safety and Nuclear Safety and Security Commission

RAEng x NAEK partnership:

- Exchange on the system dynamics for a stable, reliable grid, exploring the role of nuclear and renewable energy in decarbonising our electricity system.
- Organise a RoK – UK industry and regulator roundtable as a forum to promote open discussion on the challenges for nuclear new build.
- Form a RAEng x NAEK civil nuclear working group and associated RAEng x NAEK civil nuclear delegate directory. Example topics include:
    - regulation of new nuclear power plants
    - building supply chain readiness
    - construction phase challenges
    - approaches to diversifying talent
    - enabling capability and capacity within the workforce
    - research and development.
- Key stakeholders: Royal Academy of Engineering, National Academy of Engineering of Korea, Energy Systems Catapult

Policy-level initiatives

The following initiatives are high-level, government-to-government ideas, which if taken, could strength the UK's civil nuclear industry.

UK – RoK nuclear cooperation agreement:

- Build on the Clean Energy Partnership (2023) to incorporate areas of learning across the UK and RoK with respect to SMR deployment, together with fuel and waste management.
- Establish a biannual working group made up of academic, industry, regulatory, trade and policy experts to help establish a resilient and capable nuclear supply chain.
- Potential for UK to obtain a licensing agreement with RoK (KAERI) for the HANARO research reactor, revitalising research, assisting industry users and providing the UK with a strategic sovereign capability in radioisotope production and irradiated materials research.
- Key considerations: safeguards, return clause, intellectual property agreements, safety, licensing, workforce development
- Key stakeholders: UK government, RoK government, EDF Energy, Rolls-Royce, UK National Nuclear Laboratory, Doosan Enerbility, Korea Atomic Energy Research Institute

SMR best practice guidance:

- Create a best-practice engineering guide on SMR factory build, reflecting on RoK excellence delivered in large NPP build and the development of repeatable products.
- This can be done nationwide and then cross-analysed with RoK.
- Key stakeholders: Office for Nuclear Regulation, Rolls-Royce SMR Limited, Nuclear Safety and Security Commission, Korea Institute of Nuclear Safety, Korea Atomic Energy Research Institute, Doosan Enerbility, and academic institutions

Continue to strengthen multilateral forums to:

- Share experiences, approaches and publications relating to the use of digital and AI technology across the nuclear sector (through IAEA and OECD NEA related working groups)
- Exchange knowledge on ANTs including VHTR, SFR and molten salt systems, including materials, innovation, economics, safety and reliability, waste and decommissioning (through Generation IV International Forum, IAEA Nuclear Harmonisation and Standards Initiative and OECD NEA SMR roadmap)
- Enable continued education and training of young career professionals
- Continue engagement through OECD NEA Global Forum on:
    - defining the future of nuclear engineering education
    - rethinking the relationship between nuclear energy and society
    - building a pipeline of STEM professionals.
- Consider the opportunity for UK to join thermal hydraulic OECD NEA ATLAS project (RoK are a core member), gaining access to experimental data, test results and collaboration research opportunities. The UK could share experience from previous reactor programmes including fast reactors (PFR, DFR) and high temperature reactors (DRAGON).
- Key stakeholders: UK Government, RoK Government, International Atomic Energy Agency, Generation IV International Forum, Organisation for Economic Co-operation and Development Nuclear Energy Agency, UK National Nuclear Laboratory, academic institutions, Korea Atomic Energy Research Institute

© Shutterstock

Abbreviations

AGRs	Advanced gas-cooled reactors
AMRs	Advanced modular reactors
ANTs	Advanced nuclear technologies
ATLAS	Advanced thermal hydraulic Test Loop for Accident Simulation
Civil nuclear	Civil nuclear energy
CNS	Convention on Nuclear Safety
Gen IV	Generation IV technology
GIF	Generation IV International Forum
HALEU	high assay low enriched uranium
HANARO	High-flux Advanced Neutron Application Reactor
HECTAR	HELium Cooled Thermal Application Reactor
HTGR	High temperature gas reactors
IAEA	International Atomic Energy Agency
KAERI	Korea Atomic Energy Research Institute
KAIST	Korea Advanced Institute of Science and Technology
KALIMER	Korea Advanced Liquid Metal Reactor-600
KEPCO	Korea Electric Power Corporation
KINS	Korea Institute of Nuclear Safety
MSR	Molten salt reactors
MMRs	Micro modular reactors
NAEK	National Academy of Engineering of Korea
NPPs	Nuclear power plants
NSSC	Nuclear Safety and Security Commission
OECD NEA	Organisation for Economic Co-operation and Development Nuclear Energy Agency
ONR	Office for Nuclear Regulation
PHWR	Pressurised heavy-water reactors
PPP	Public private partnerships
PWRs	Pressurised water reactors
RAEng	Royal Academy of Engineering
RoK	Republic of Korea
R&D	Research and Development
SFRs	Sodium-cooled fast reactors
SMRs	Small modular reactors
STELLA 2	Sodium Integral Effect Test Loop for Safety Simulation and Assessment 2
VHTGR	Very high temperature gas reactors
UK	United Kingdom
US	United States

Definitions

Advanced nuclear technology: collective term for the wide range of innovative small and advanced reactors under development in the nuclear sector, including SMRs, AMRs and micro modular reactors (MMRs). ANTs are smaller in size, both in terms of power output and land footprint, than large gigawatt-scale reactors.

Clean Energy Partnership: UK – RoK partnership setting out both country's intent to strengthen cooperation on their shared interests and ambitions across the clean energy transition, low carbon technologies and domestic climate policies and civil nuclear energy.

Convention on Nuclear Safety treaty: international treaty that aims to commit Contracting Parties operating land-based civil nuclear power plants to maintain a high level of safety by establishing fundamental safety principles to which States would subscribe.

Goal-setting: the licensee is responsible for nuclear safety. The regulator will set goals, for example, demonstrate that under all design-basis accidents, the reactor core remains adequately cooled and damage is prevented. The licensee will decide how to deliver this.

Great British Energy – Nuclear: nuclear energy and fuels company owned by the UK Government. A non-departmental public body sponsored by the UK Department for Energy Security and Net Zero.

HALEU: high assay low enriched uranium (fuel enriched to between 10% and 20% of the U-235 isotope). It uses oxide, salt and metal as fuel and will power many Gen IV reactors.

Joint Fuel Cycle study: long-term study launched in 2011 designed to evaluate the non-proliferation acceptability, technical feasibility, and economic viability of various fuel cycle technologies. Prescriptive: regulator will set out exactly what steps to take, for example, the emergency core cooling system must include a high-pressure injection system with a capacity of X and a low-pressure injection system. The licensee will have to deliver this according to the regulators requirements.

Pyroprocessing: an electrochemical process to separate plutonium with the other actinides from spent fuel. KAERI argue this is proliferation resistant because it does not produce pure plutonium.

Regulation: the action of making and enforcing rules to control activities.

Regulatory harmonisation: the process by which technical guidelines are developed to be uniform across participating authorities.

Small modular reactors: a reactor with a capacity of up to 300 MWe as a carbon-free energy source, which can be utilized in various industries such as hydrogen production, process heat utilization, and other applications.[40]

UK Destination Nuclear: UK government campaign that brings together government organisation to attract new and retain existing talent across the nuclear sector, to help fill critical skills gaps.

Annex 1 – Agenda

1. 19 March 2025:

1.1 Korea-UK Clean Energy Workshop on Nuclear Energy

Opening remarks

- Euijoon Yoon, President of NAEK
- Dr Dame Sue Ion GBE FREng FRS, Honorary President of UK National Skills Academy for Nuclear

Keynote session

- Hong-Kyu Kang, Senior Vice President of Nuclear Design/Manufacturing at Doosan Enerbility
- Dr Dame Sue Ion GBE FREng FRS, Honorary President of UK National Skills Academy for Nuclear

Session 1: Status and barriers of nuclear deployment

- Professor Tim Abram FREng, Professor of Nuclear Fuel Technology, University of Manchester
- Bum-Jin Chung, Professor of Nuclear Engineering, Kyung Hee University

Discussion and Q&A

- Chair: Joohyun Moon, Professor of Energy Engineering, Dankook University
- Panellists: Sung-Tae Yang, Vice President, Nuclear Fuel Office, Korea Hydro Nuclear Power (KHNP); Hyung Jin Shim, Professor of Nuclear Engineering, Seoul National University; Dr Dame Sue Ion; Professor Tim Abram

Session 2: Future of the UK – Korea Nuclear Partnership

- Chae Young Lim, Senior Vice President KAERI
- Professor Fiona Rayment OBE FREng, President of UK Nuclear Institute

Discussion and Q&A

- Chair: Won-Pil Baek, Senior Research Fellow, KAERI
- Panellists: Baek-Sik Noh, Executive Vice-Chairman, Korea Atomic Industrial Forum; Dr Ming Tan, Global Nuclear Practice Lead, Mott MacDonald; Chae Young Lim, Senior Vice President, KAERI; Professor Fiona Rayment

Session 3: Workforce Capacity Building and Regulatory Harmonisation

- Dr Sarah Williamson FREng, Programme Director, Laing O'Rourke
- Professor Laurence Williams OBE FREng FLSW, Professor of Nuclear Policy and Regulation, Bangor University
- Joohyun Moon, Professor of Energy Engineering, Dankook University

Discussion and Q&A

- Chair: Bum-Jin Chung, Professor of Nuclear Engineering, Kyung Hee University
- Panellists: Chang Sun Jang, Head of the Nuclear Division, National Research Foundation of Korea; Dr Sarah Williamson FREng; Professor Laurence Williams; Joohyun Moon, Professor of Energy Engineering, Dankook University

Final reflections: summary of takeaways and next steps

- Dr Dame Sue Ion
- Bum-Jin Chung

1.2 UK – RoK Civil Nuclear Energy Networking Reception at the British Ambassador's Residence

2. 20 March 2025:

2.1 Site visit to KAERI

- Greeting and an introductory meeting: Lim Chaeyoung, Senior Vice President, Department of Nuclear Policy and Strategy, KAERI
- ATLAS (Advanced Thermal-hydraulic Test Loop for Accident Simulation)
- STELLA-2 (Sodium Test Loop for Safety Simulation and Assessment)
- HANARO (High-flux Advanced Neutron Application Reactor)

3. 1 March 2025:

3.1 UK – KAERI Joint Workshop on Advanced Nuclear Technologies

Congratulatory remarks

- Dr Lim In Cheol, Executive Vice President, KAERI
- Dr Dame Sue Ion, Fellow, Royal Academy of Engineering (RAEng)

Overview of UK-ROK Civil Nuclear Partnership

- Mark Hastie-Oldland, Deputy Director, Department for Energy Security and Net Zero (DESNZ)

Session 1: Gen IV Technologies & Cogeneration

- ROK's Development of Molten Salt Reactor (MSR), Lee Dong-Hyoung, Vice President of Molten Salt Reactor Development Division, KAERI
- ROK's Development of Sodium-cooled Fast Reactor (SFR), Lee Jewhan, Director of Gen IV Reactor Technology Development Division, KAERI
- ROK's Development of Very High Temperature Reactor (VHTR), Park Byungha, Head of High Temperature Reactor Management Team, KAERI
- UK's Gen IV Development Policy, Simon Dilks, Head of Nuclear & Renewable Innovation, Science & Innovation for Climate & Energy, DESNZ
- UK's Approach to High Temperature Gas Reactor (HTGR), Professor Tim Abram, Professor in Nuclear Fuel Technology, University of Manchester & Fellow RAEng

Open Discussion

Session 2: High Assay Low Enriched Uranium (HALEU)

- HALEU Development: Technology and Regulatory Challenges, Professor Laurence Williams
- ROK's Plans for Advanced Fuels, Kim Jun Hwan, Director of Advanced Fuel Technology Development Division, KAERI
- UK's HALEU Programme, Jacob White, Fuels Policy Lead, Nuclear Fuels Delivery Team, DESNZ
- UK Industry Perspective: Urenco, Michael Bryant, Vice President, Urenco

Open Discussion

Annex 2 – List of delegates

RAEng delegation

- Dr Dame Sue Ion GBE FREng FRS, Honorary President, National Skills Academy for Nuclear
- Professor Tim Abram FREng, Professor of Nuclear Fuel Technology, University of Manchester
- Elina Lee, Civil Engineer, Mott MacDonald
- Jake Moorman, Site Evaluation Technical Support, Nuclear Waste Services / International Liaison, Nuclear Institute Young Generation Network
- Professor Fiona Rayment OBE FREng, President, Nuclear Institute
- Dr Ming Tan, Global Nuclear Practice Lead, Mott MacDonald
- Professor Laurence Williams OBE FREng FLSW, Professor of Nuclear Policy and Regulation, Bangor University
- Dr Sarah Williamson FREng, Programme Director, Laing O'Rourke

NAEK delegation

- Euijoon Yoon, President of National Academy of Engineering of Korea
- Dr. Won-Pil Baek, Senior Research Fellow, Korea Atomic Energy Research Institute, and Member of NAEK
- Professor Bum-Jin Chung, Department of Nuclear Engineering, Kyung Hee University, and Associate Member of NAEK
- Dr. Chang Sun Jang, Director of the Nuclear Energy Division, National Research Foundation of Korea
- Jongwoo Kim, Vice President, Nuclear Business Group, Doosan Enerbility
- Dr. Chae Young Lim, Senior Vice President, Korea Atomic Energy Research Institute, and Associate Member of NAEK
- Professor Joohyun Moon, Energy Engineering Department, Dankook University, and Associate Member of NAEK
- Baek-Sik Noh, Executive Vice Chairman, Korea Atomic Industrial Forum
- Professor Hyung Jin Shim, Nuclear Engineering Department, Seoul National University
- Sung-Tae Yang, Vice president, Nuclear Fuel Department, Korea Hydro & Nuclear Power

RAEng staff

- Shane McHugh, Associate Director, Royal Academy of Engineering
- Meredith Ettridge, Associate Director, Royal Academy of Engineering
- Alaka Bhatt, Senior Programme Manager, Royal Academy of Engineering
- Taylor Huson, Programme Manager, Royal Academy of Engineering
- Alisha Assomull, Programme Officer, Royal Academy of Engineering

UK event delegates

- Dr Dame Sue Ion GBE FREng FRS FIoM3 FNucl, Honorary President, National Skills Academy for Nuclear
- Professor Tim Abram FREng, Professor of Nuclear Fuel Technology, University of Manchester
- Elina Lee, Civil Engineer, Mott MacDonald
- Jake Moorman, Site Evaluation Technical Support, Nuclear Waste Services / International Liaison, Nuclear Institute Young Generation Network
- Professor Fiona Rayment OBE, PhD, FREng, President, Nuclear Institute
- Dr Ming Tan, Global Nuclear Practice Lead, Mott MacDonald
- Professor Laurence Williams OBE FREng FLSW FIMechE FNucl, Professor of Nuclear Policy and Regulation, Bangor University
- Dr Sarah Williamson FREng, Programme Director, Laing O'Rourke

References

1. Energy, Hannah Ritchie, Max Roser, and Pablo Rosado (2022) (accessed 9 June 2025)
2. Clean Energy Partnership between the United Kingdom and the Republic of Korea, DESNZ, 2023
3. UK – KAERI Joint Workshop on Advanced Nuclear Technologies, 21 March 2025
4. UK – KAERI Joint Workshop on Advanced Nuclear Technologies, 21 March 2025
5. Korea-UK Clean Energy Workshop on Nuclear Energy, 19 March 2025
6. Korea-UK Clean Energy Workshop on Nuclear Energy, 19 March 2025
7. Korea-UK Clean Energy Workshop on Nuclear Energy, 19 March 2025
8. Thousands of jobs to be created as government announces multi-billion-pound investment to build Sizewell C, GOV.UK (2025) (accessed 20 June 2025)
9. Energy, Hannah Ritchie, Max Roser, and Pablo Rosado (2022) (accessed 9 June 2025)
10. 'History', IAEA (accessed 9 June 2025)
11. 'What we do', NEA (accessed 9 June 2025)
12. Clean Energy Partnership between the United Kingdom and the Republic of Korea, DESNZ, 2023
13. Korea-UK Clean Energy Workshop on Nuclear Energy, 19 March 2025
14. Korea-UK Clean Energy Workshop on Nuclear Energy, 19 March 2025
15. Korea-UK Clean Energy Workshop on Nuclear Energy, 19 March 2025
16. Korea-UK Clean Energy Workshop on Nuclear Energy, 19 March 2025
17. In the UK the creation of Great British Energy – Nuclear aims to address some of the issues associated with the privatisation of nuclear energy.
18. Please note, the financial risk is not equal, with the majority borne by the government, with the private companies taking on project level risks.
19. UK – KAERI Joint Workshop on Advanced Nuclear Technologies, 21 March 2025
20. UK – KAERI Joint Workshop on Advanced Nuclear Technologies, 21 March 2025
21. UK – KAERI Joint Workshop on Advanced Nuclear Technologies, 21 March 2025
22. GBN at final stage of Small Modular Reactor selection process, Great British Energy – Nuclear (2025) (accessed 9 June 2025)
23. UK – KAERI Joint Workshop on Advanced Nuclear Technologies, 21 March 2025
24. UK – KAERI Joint Workshop on Advanced Nuclear Technologies, 21 March 2025
25. UK – KAERI Joint Workshop on Advanced Nuclear Technologies, 21 March 2025
26. UK – KAERI Joint Workshop on Advanced Nuclear Technologies, 21 March 2025
27. UK – KAERI Joint Workshop on Advanced Nuclear Technologies, 21 March 2025. Please note: in June 2025 only the US and Russia produce HALEU.
28. UK – KAERI Joint Workshop on Advanced Nuclear Technologies, 21 March 2025. Please note: these figures do not include match funding.
29. UK – KAERI Joint Workshop on Advanced Nuclear Technologies, 21 March 2025
30. Korea-UK Clean Energy Workshop on Nuclear Energy, 19 March 2025
31. Korea-UK Clean Energy Workshop on Nuclear Energy, 19 March 2025
32. Korea struggles to find new workers for growing nuclear reactor industry, Cho Yong-Jun (2024) (accessed 9 June 2025)
33. Korea-UK Clean Energy Workshop on Nuclear Energy, 19 March 2025
34. Workforce aging could hurt Korea's manufacturing: report, The Korea Herald (2021) (accessed 9 June 2025)
35. Korea-UK Clean Energy Workshop on Nuclear Energy, 19 March 2025; This figure refers to projected net zero related construction calculated using McKinsey Global Institute net zero estimates, assuming all net zero capital expenditures in power, buildings, fossil fuels and industry directed to construction.
36. South Korea's construction industry faces graying crisis, The Chosun Daily (2025) (accessed 9 June 2025)

37. ‘Nuclear Engineering Search Results’, UCAS (access 9 June 2025); This includes: University of Birmingham, University of Liverpool, University of Manchester, University of Surrey, Imperial College London, University of Lancaster, Nottingham Trent University, University of West Scotland, Aston University, University of Aberdeen, University of Leeds, University of Bristol, University of Cambridge, Swansea University, University Centre Somerset.

38. Korea-UK Clean Energy Workshop on Nuclear Energy, 19 March 2025; This includes: Sejong University, Chung-Ang University, Dankook University, Kyungpook National University, Pohang University of Science and Technology, Dongguk University, Uiduk University, Ulsan National Institute of Science and Technology, KEPCO International Nuclear Graduate School, Busan National University, Hanyang University, Seoul National University, Kyung Hee University, KAIST, Jeonbuk National University, Chosun University, Jeju National University.

39. Korea-UK Clean Energy Workshop on Nuclear Energy, 19 March 2025

40. Korea-UK Clean Energy Workshop on Nuclear Energy, 19 March 2025

The **Royal Academy of Engineering** creates and leads a community of outstanding experts and innovators to engineer better lives. As a charity and a Fellowship, we deliver public benefit from excellence in engineering and technology and convene leading businesspeople, entrepreneurs, innovators and academics across engineering and technology. As a National Academy, we provide leadership for engineering and technology, and independent, expert advice to policymakers in the UK and beyond.

We have three goals:

Sustainable and Innovative Economy, where sustainability drivers, innovative industries and resilient infrastructures are aligned to drive growth and productivity that will support better lives for all.

Technology Improving Lives, where technology in all its forms is used to meet the most important human needs, avoid harm, support fairer societies and break down barriers to opportunity.

Engineering Community Fit for the Future, where our community reflects society in its diversity, commits to creating inclusive cultures to help drive engineering excellence, and has the skills to meet future needs safely, securely and ethically, and to keep pace with innovation.

Royal Academy of Engineering

Royal Academy of Engineering
Prince Philip House
3 Carlton House Terrace
London SW1Y 5DG

Tel: +44 (0)20 7766 0600
www.raeng.org.uk

Registered charity number 293074