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Competences for preparedness, safety and progress

Radiation protection – Nuclear safety – Waste management

Competence in radiation protection, nuclear safety and radioactive waste management as well as research into advancement of these areas is necessary in many fields: it ensures greater protection and safety for society while also strengthening Germany's position as a centre of technology. However, for years, Germany has been on a path towards losing this foundation[1], as the importance of these competences for society has been receiving less and less attention and qualifying the younger generation for them receives fewer and fewer resources. Against this worrying backdrop, the three commissions advising the Federal Ministry for the Environment (BMUKN) – SSK, RSK and ESK – are for the first time jointly appealing to political decision-makers at national and Land level to take measures to maintain and expand competences in the above-mentioned areas.

Why do we still need competence in radiation protection, nuclear safety and nuclear waste management after the phase-out of nuclear energy for electricity generation?

The safe utilization of nuclear energy for electricity generation has been a dominant topic in the aforementioned areas of competence for decades. However, there are many other areas of application that are often overlooked. We are all facing increasing societal and technological challenges caused by fundamental changes in a world shifting to a significantly more competitive geopolitical environment. Our prosperity and health increasingly depend on the development of innovative approaches in medicine and technology, which often use radiation or involve increased exposure to radiation. We must protect employees and the population as a whole from the adverse effects of this radiation. Additionally, protection against increased UV radiation due to climate change as well as health care in regions with potentially elevated exposure to radon play an important role. Military conflicts in Europe have revealed potential threats to the safety of nuclear power plants and storage facilities for radioactive waste, highlighting the importance of civil defence and emergency response. New nuclear power plant designs are currently being developed and constructed in our neighbouring countries, and their safety must be assessed independent of developers and operators. The planned development of nuclear fusion plants[2] must be accompanied by safety analyses and new radiation protection concepts. The safe disposal of radioactive waste from past utilisation of nuclear energy, from medicine and research, and possibly in the future also from nuclear fusion, must be guaranteed in the long run.

[1] https://ssk.de/fileadmin/documents/de/2006/Kompetenzerhalt_Strahlenforschung.pdf
https://ssk.de/fileadmin/documents/de/2021/2021-06-09_Stgn_Kompetenzerhalt.pdf
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https://www.bmwk.de/Redaktion/DE/Publikationen/Energie/konzept-zur-kompetenz-und-nachwuchsentwicklung-fuer-die-nukleare-sicherheit.pdf

[2] https://www.bmftr.bund.de/SharedDocs/Publikationen/DE/7/1112618_Aktionsplan_Fusion.pdf

Note: This is a translation of the Appeal by SSK/RSK/ESK entitled “Kompetenzen für Sicherheit und Fortschritt”. In case of discrepancies between the English translation and the German original, the original shall prevail.

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These and various other challenges (see table) must be overcome to ensure a secure future for our society and the health of the population. To this end, economy, science and public authorities require sound and sustainable competences in radiation protection, nuclear safety, and the safe management of radioactive waste.

Radiation protection	Nuclear safety	Waste management
✓ Fighting cancer through **innovations in imaging and radiotherapy** ✓ Protection against increased **UV radiation due to climate change** ✓ Risk assessment of electromagnetic fields due to expansion of power grid and **mobile communications network** ✓ Preventive health care in areas with increased natural occurrences of **radioactive radon** ✓ Civil defence and emergency response in the event of **nuclear and radiological incidents** ✓ Radiation protection concepts for and safety issues relating to **nuclear fusion**	✓ Operation and safety assessment of existing nuclear installations in Germany (e.g. **research reactors**) ✓ Safety assessment of **existing and new plants abroad** as well as of **new reactor concepts** ✓ Promotion of high safety standards through participation in the development of **international rules and regulations** ✓ Safety issues relating to **nuclear fusion**	✓ Operation and safety assessment of **interim waste storage facilities** ✓ **Decommissioning of nuclear installations** and other facilities and treatment of radioactive waste arising from this process ✓ Selection and safety assessment of a **repository site** ✓ Construction, operation and closure of **repositories** ✓ Handling and disposal of radioactive materials from current and future technologies, such as **nuclear fusion**

How does Germany benefit from competences in the above-mentioned areas?

- **They contribute to a crisis-resilient society!**
  They are necessary for the best-possible civil defence and emergency preparedness in times of increased nuclear threat. They support the development of high safety standards for installations in neighbouring countries and ensure radiation protection in new technical developments. They also support the adaptation of public spaces to increased UV radiation caused by climate change and guarantee the safety of the storage of radioactive waste.
- **They help to develop cutting-edge medicine and ensure broad medical care!**
  They are necessary for maintaining routine operation in diagnostics and for its further development, and they make it possible to improve tumour targeting with radiation.
- **They help us to fulfil our obligations to future generations!**
  They form the basis for the safe and reliable disposal of radioactive waste, both now and in the future.

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- **They are a prerequisite for the development of safe nuclear fusion power plants!**
  They support the development and safety assessment of nuclear fusion plants, the evaluation of the effects and behaviour of tritium in the environment, and the development of concepts for radiation protection, the fuel cycle, and the disposal of radioactive material produced during nuclear fusion.
- **They strengthen Germany as a centre of technology!**
  They support e.g. the energy transition in dealing with electromagnetic fields, such as those generated by grid expansion, the development of autonomous driving, and electromobility. They are a basic prerequisite for manned spaceflight, especially for protection against cosmic radiation during longer space missions. Through sound risk assessment and risk communication, they contribute to the safety, acceptance and sustainable success of these and many other technologies.[3]
- **They increase Germany's international visibility as a centre of technology!**
  They increase visibility of German expertise to international committees and its attractiveness for integration into future innovative developments abroad.

What do the commissions consider necessary in order to maintain and expand these competences?

In order to maintain and expand the competences required in the various specialist areas, the commissions recommend that decision-makers at federal and Land level consistently and sustainably implement the Federal Government's concept for competence and young talent development in nuclear safety, as well as the recommendations for action issued by the Federal Environment Ministry[4] and the SSK[5]. Building on previous measures taken by federal and Land ministries to maintain and expand competence, the commissions consider the following measures to be particularly important:

- **Strengthening sustainable cooperation at federal and Land level in terms of shared responsibility for maintaining and expanding competence**
- **Provision of adequate long-term research funding in the relevant fields of competence[6] by the federal and Land governments and facilitation of interdisciplinary research consortia and networks for addressing ambitious interdisciplinary issues[5,6]**
- **Strengthening basic research and the experimental infrastructure in relevant fields of competence[6]**
- **Maintaining and further developing training and professional development opportunities at universities, academic and non-academic institutions, as well as supporting the establishment of nationwide academic and professional colleges for the relevant fields of competence[4,6]**

[3] https://www.bmftr.bund.de/SharedDocs/Publikationen/DE/L/31881_Hightech_Agenda_Deutschland.pdf
[4] https://www.bmwk.de/Redaktion/DE/Publikationen/Energie/konzept-zur-kompetenz-und-nachwuchsentwicklung-fuer-die-nukleare-sicherheit.pdf
[5] https://www.kvsf.de/fileadmin/user_upload/Bilder_%26_Grafiken/Dateien/Definition_ZielE_20250511.pdf
[6] https://www.grs.de/sites/default/files/2025-09/KVKT-White-Paper-2025.pdf
https://ssk.de/fileadmin/documents/de/2023/2023-09-12_Empf_Kompetenzerhalt_Massnahmen.pdf

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