

NEA Project on Waste Integration for Small and Advanced Reactor Designs (WISARD)

Innovative nuclear systems require innovative waste management solutions

The NEA project on Waste Integration for Small and Advanced Reactor Designs (WISARD) will investigate how waste from advanced systems can be managed and how design-phase decisions impact back-end strategies necessary to support sustainable future nuclear systems.

WISARD builds on global interest in innovative fuels, small modular reactors and Generation IV systems for sustainable nuclear energy. This project capitalises on the opportunity to integrate a sustainable spent fuel and waste management strategy from the very beginning of advanced reactor life cycles.

The WISARD project will assess the back-end impacts of front-end and reactor design decisions, provide opportunities to avoid unnecessary costs by addressing possible issues during the design phase, and support efforts to ensure long-term sustainability.



Innovative fuels



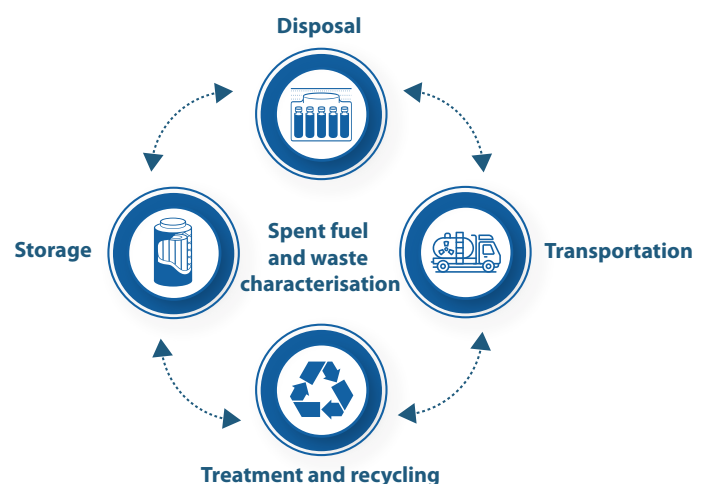
Advanced reactor types



Small modular reactors

The main goals of the WISARD project will be to investigate how innovative reactor fuels, materials, sizes and operating schemes may in turn require innovative options for radioactive waste management in areas such as:

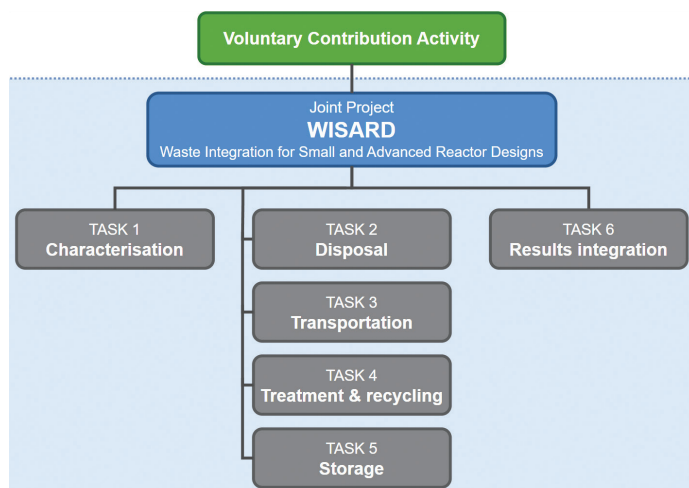
- used fuel and waste storage;
- treatment, recycling and reprocessing;
- transportation; and
- long-term disposal.



Performance assessments

Decay heat and thermal analysis	Criticality safety	Radiation shielding
Spent fuel isotopic composition	Fuel chemistry and integrity	Generic safety case

The WISARD project will be structured into six tasks (see graphic below), beginning with a characterisation of the waste streams from advanced technologies. These data will then be used to inform the focus areas of disposal, transportation, treatment and recycling, and storage. Considering each of these areas within the same project will avoid duplication of effort and enable data standardisation.



The WISARD project will provide a flexible structure in which participants can join some or all of the tasks, depending on their interest and needs. The sixth and final task will be to integrate the results from the project, identifying inter-dependencies between topics and providing a holistic assessment of integrated waste management strategies for advanced systems and fuels.



The WISARD project will be a closed project and so all data provided by participants and all project results will be subject to non-disclosure agreements, as decided by the WISARD Management Board. Each participant will nominate a representative to the Management Board to represent their views and be involved in all project decisions.

Project timeline

The WISARD project will span three years. Its scope will be developed through 2023 and 2024 in collaboration with interested parties, with work expected to officially start in Q1 2025 and progress until 2027.

During the project development phase, additional participants can still be accommodated. Interested parties are invited to contact the NEA for further information on the joining process.

Preparatory phase

The WISARD project will begin with a one-year preparatory phase funded by voluntary contributions from interested parties. The project scope and formal legal agreement will be developed in collaboration with participating organisations.

Preparatory phase activities will include:

1. Identification of project needs and data availability
 - a. Definition of specific reactor systems to be considered;
 - b. Examination of current state-of-the-art assessment methods, including available software and tools, in each focus area;
 - c. Evaluation of information required to perform desired assessments of designated systems;
 - d. Analysis of existing data available from diverse sources, including:
 - i. NEA databases;
 - ii. Open source information;
 - iii. System-specific data.
 - e. Verification and validation of available data, including identification of missing information and gap analysis.
2. Development of work scope
 - a. Definition of project tasks and programmes of work;
 - b. Creation of infrastructure required for WISARD, including:
 - i. Knowledge management database;
 - ii. Definition of engineering software tool chains;
 - iii. IT platform to facilitate effective collaboration.
 - c. Identification of areas of complementary participant expertise.

Further information

For more information on WISARD, including how to get involved with the project, please contact the NEA: WISARD@oecd-nea.org.